



Patient Education

Range of Motion

A guide for you after spinal cord injury

Spinal Cord Injury
Rehabilitation Program

This booklet has been written by the health care providers who provide care to people who have a spinal cord injury or illness. At the time of this printing the information was accurate to the best of our knowledge. The information may change due to the rapid changes in health care. It is not intended to replace medical/health advice from your health care providers.

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Table of Contents

	Page
Joint Range of Motion.....	1
Guidelines in using the book.....	2
Range of Motion with a Partner	3
Shoulder and elbow exercises.....	4
Wrist and finger exercises	7
Hip exercises	11
Knee exercises	17
Ankle and toe exercises.....	19
Back exercises.....	21
Neck exercises	25
Doing Your Own Range of Motion.....	27
Hip and knee exercises	29
Ankle and toe exercises.....	33
Back exercises.....	35
Neck exercises	39

Joint Range of Motion

Range of Motion, or ROM is the range through which a joint can be moved. Before your injury you usually moved your joints many times during the day. After a spinal cord injury you may move less.

Without movement your joints can become tight. Your movement may be limited because of this tightness. An increase in resistance to stretching can make matters worse. If tightness develops, your activities of daily living can become more difficult than they already are. Doing ROM to your joints can help prevent this tightness.

You may have to do ROM exercises every day. This booklet will show you the different ROM stretches you can do for your joints. There are 2 parts to guide you through a routine of stretches to maintain your ROM:

1. Range of motion with a partner
2. Doing your own range of motion

Guidelines in using the book

- This book shows stretching for each joint.
- A good time to do your ROM is in the morning while you are still in bed. It will help to loosen your joints before you start your day's activities and will keep your muscles from getting tight.
- Do each movement slowly and gently 5 times. Hold for 5 seconds at the end of range to stretch your muscles. The end of range is a firm feeling that the muscle is stretched to its limit, think about how that particular joint moves as a guide. Forceful, jerky moves can cause damage. Be careful, you can damage the joints and muscles.
- Hold the arm or leg firmly, supporting each joint as you move it through its normal path.
- This book shows each move in one direction. You will reverse the move to return to the starting position.

Here are some common words that are helpful in learning about ROM.

Adduction - the limb, arm or leg, moves in or toward the centre of the body

Abduction - the limb, arm or leg, moves away out from the centre of the body

Flexion – is bending

Extension – is straightening

Range of Motion with a partner

This section shows how to do ROM with a partner. Your physiotherapist will teach you what and how to do these movements. Your attendant or partner will also be taught how to help you. You will also be able to teach your attendant or partner how to do your stretching. Use this book to remind yourself what to do or help you teach others.

Shoulder and elbow exercises with a partner

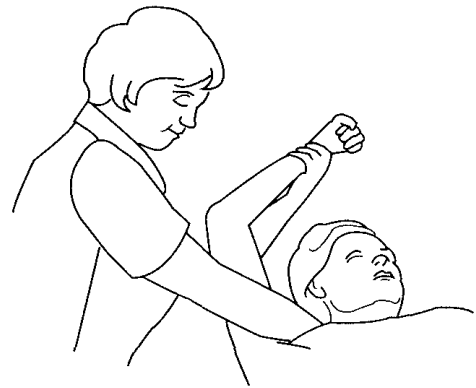
Flexion

Step 1

- One hand holds the forearm, palm up, the other grasps the top of the shoulder joint.

Step 2

- Lift the arm up over the head, keeping the elbow slightly bent.



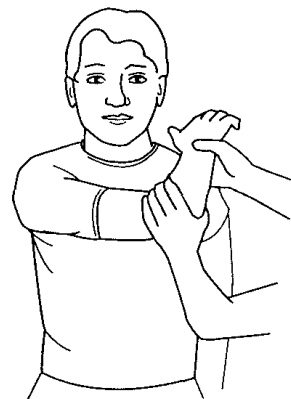
Horizontal flexion

Step 1

- Support the arm at the elbow and at the wrist.

Step 2

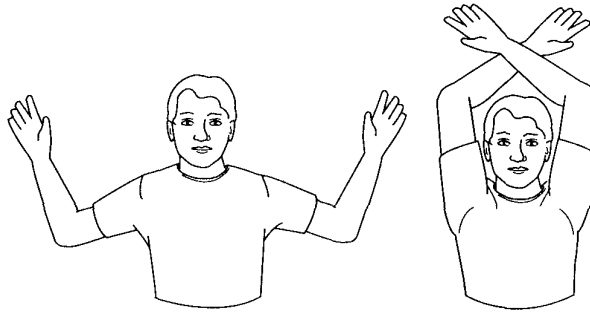
- Move the arm across the body at shoulder level bringing the hand towards the top of the opposite shoulder.



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Positions for prolonged stretching

- Lie on back, place the arms in either position as shown.

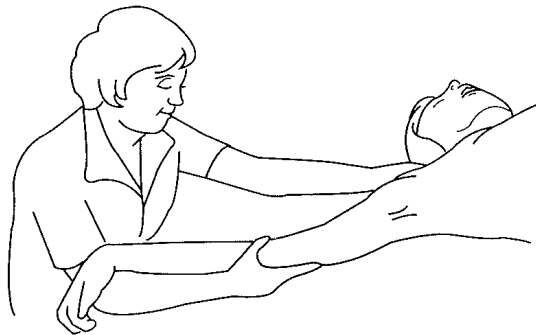


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Abduction – moving your arms outwards

Step 1

- Move the arm out to the side. One arm supports the forearm with the hand holding the elbow. The other hand grasps the shoulder.



Step 2

- Slide the arm away from the body along the surface of the bed.
-

Turning the shoulder

Step 1

- Start with the elbow bent to 90°, and the upper arm out to the side to shoulder level. One hand holds the forearm near the wrist, the other holds the shoulder.

Step 2

- Gently turn the forearm outward to touch the bed with the back of the hand, then rotate the forearm back until the palm of the hand touches the bed. The shoulder joint is rotating or turning.



If you are not able to touch the bed and end of range has been reached stop there. Hold for 5 seconds, then release.

Elbow

Bend and straighten

Step 1

- One hand holds the wrist, the other holds the upper arm.

Step 2

- Bend the elbow, then straighten it out fully.

Elbow

Palm up and palm down

Step 1

- One hand holds the wrist, the other holds the upper arm.

Step 2

- Turn the forearm until the palm faces up, then turn it back until the palm faces down.
-

Wrist and finger exercises with a partner

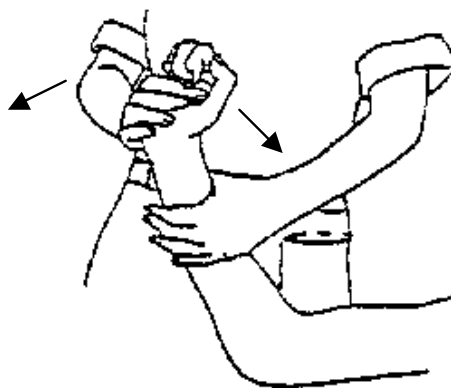
Wrist flexion and extension

Step 1

- One hand holds the forearm, the fingers of the other hand holds the palm and back of the hand.

Step 2

- Bend the wrist back, let the fingers curl naturally. Do not straighten the fingers fully with the wrist stretched back.



Step 3

- Bend the wrist the other direction, the fingers will straighten naturally.

Fingers

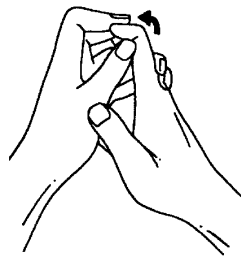
If you use the natural bend of your fingers to help you to grasp objects be careful not to straighten your fingers fully while your wrist is stretched back.

Step 1

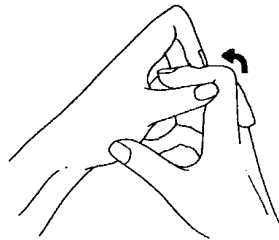
Hold the wrist in a neutral position, not bent back or forward.

Step 2

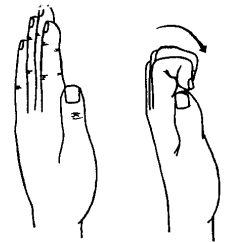
Bend and straighten each finger and joint separately. Support below the finger joint you are moving. Do the fingertips first, then the next joint.



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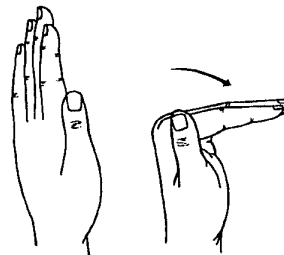
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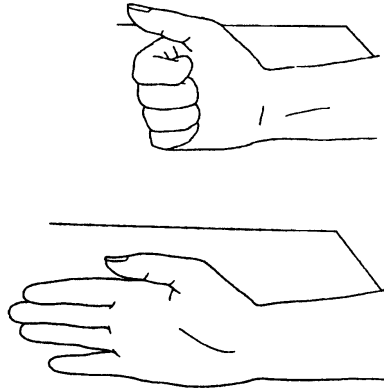
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Step 3

Bend all fingers in to make a fist, then straighten the fingers.



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Web space stretch

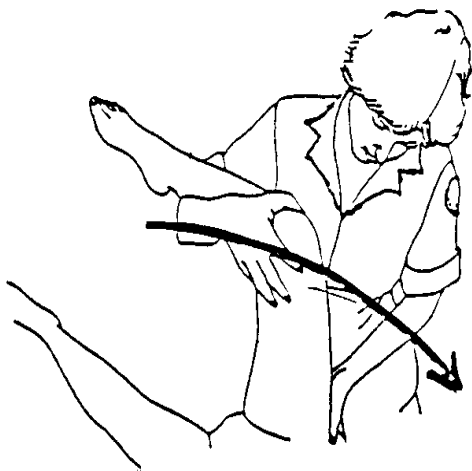
- Stretch the web space between the thumb and index finger.



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Hip exercises with a partner

Hip and knee flexion



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Step 1

- One arm cradles the leg with the knee bent, the other hand holds at the side of the hip.

Step 2

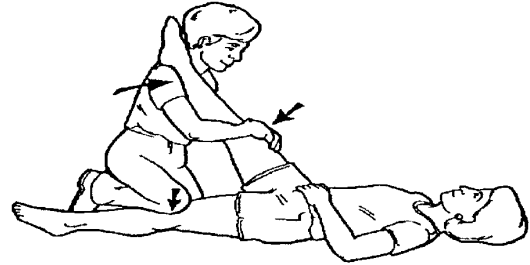
- Bend the knee toward the chest. Do not let the foot or the knee twist to the side. Support under the knee as you straighten the leg to prevent the knee from jarring into extension.

Hip flexion with the knee straight hamstring stretch



Step 1

- Place the lower part of the leg on your shoulder as shown. Hold the knee straight with one hand.



Step 2

- Move forward to push the leg upward so that the back of the leg is stretched. **Stop short of causing back pain.**

Moving the leg to the side

hip abduction

Step 1

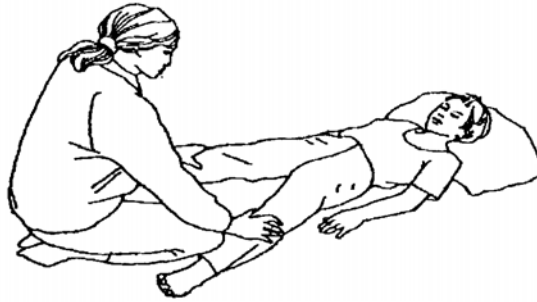
- One arm cradles the straight leg with the hand holding the knee. The other hand holds the side of the hip.

Step 2

- Move the leg along the surface of the bed away from the other leg.



- Another way to do abduction is lying flat with the hips level. Gently and slowly draw the legs apart keeping the knees straight.
- Move the leg back into the center.



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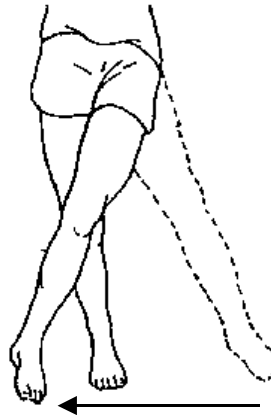
Hip adduction

Step 1

- Support the leg under the heel and under the knee.

Step 2

- Lift the leg with the knee straight just high enough to clear the other leg. Move the leg towards the center across the other leg.



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Hip extension

Step 1

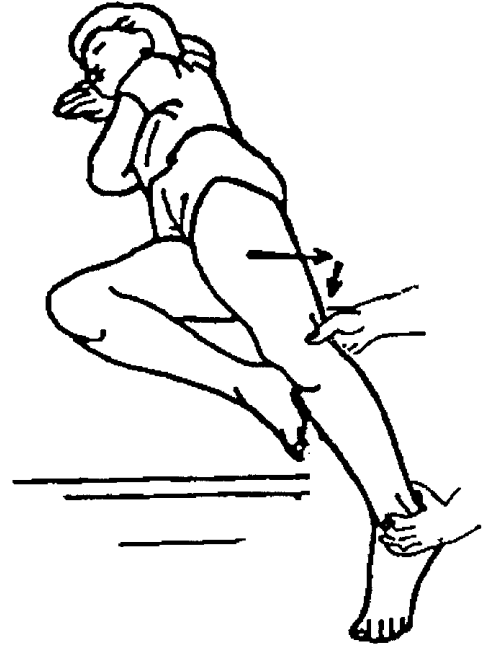
- The patient should be lying on his/her side with the bottom leg comfortably bent at the hip and knee.

Step 2

- Stand behind the patient. Cradle the lower part of the top leg in one hand and grasp the thigh with your other hand.

Step 3

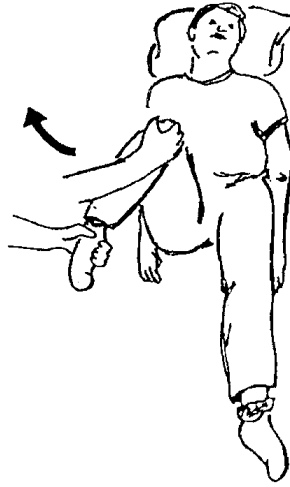
- Bring the leg back toward you extending the hip. Stop before the low back starts to bend. Hold this stretch for 30 seconds.



Hip rotation

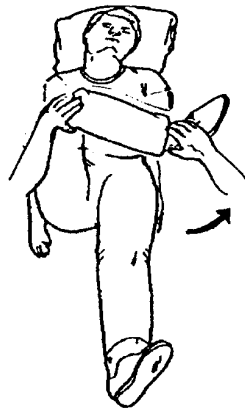
Step 1

- Bend the hip and the knee to 90°. Grasp the top of the knee with one hand, hold the heel of the foot with the other hand.



Step 2

- Keep the hip and knee at 90° and gently turn the leg inward, rotating the hip joint. Never force this movement.



Step 3

- Return to the center and then turn the leg outward. You are rotating the hip joint. Never force this movement.

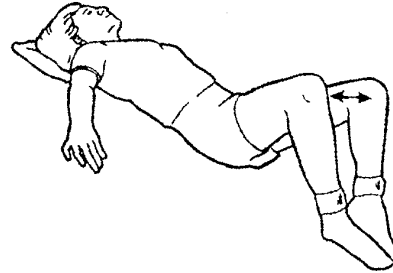


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Hip external rotation - prolonged stretch

Step 1

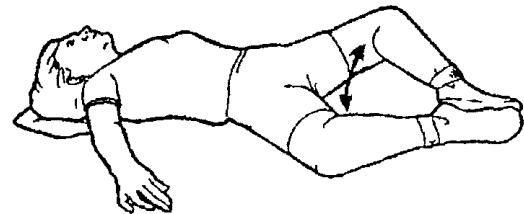
- Gently bend each leg into flexion at the hip and knee.



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Step 2

- Place the feet sideways on the bed with the soles of the feet against each other.



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Step 3

- Stay in this position for 20 to 30 minutes, or as recommended by your therapist.

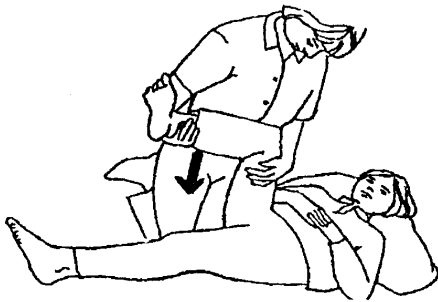


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Knee exercises with a partner

Knee flexion and extension

The knee has been moved with the hip. However, it is important to make sure that it straightens fully and bends fully.



Flexion

Step 1

- With the hip bent towards the chest slowly lower the foot towards the bed letting the knee bend.



Extension

Step 2

- Support under the knee as you straighten the leg to prevent the knee from jarring into extension.

Ankle and toe exercises with a partner

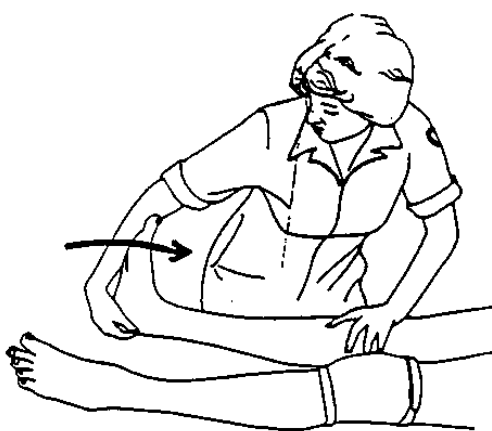
Ankle heel cord stretch

Step 1

- Cradle or cup the heel of the foot in the palm of your hand. Keep the inside of the forearm in contact with the sole of the foot.

Step 2

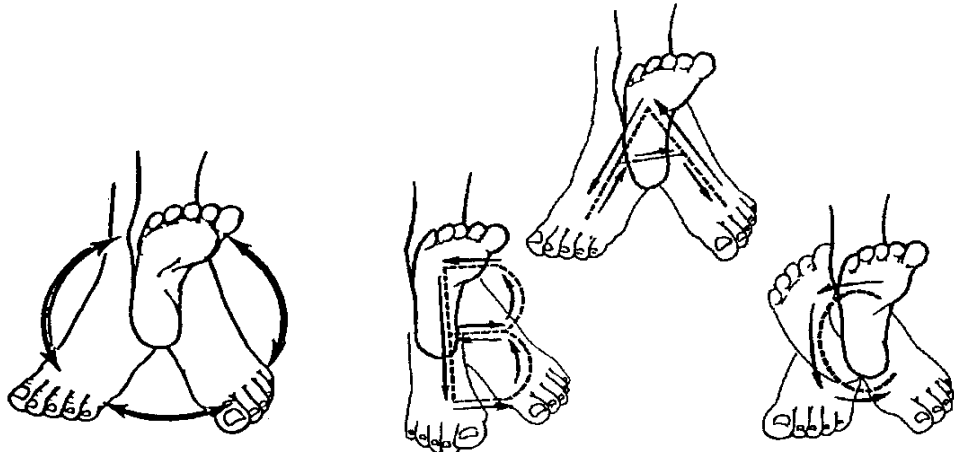
- Hold the knee straight with your other hand. Gently draw the foot towards a right angle that is up and slightly outward.



Step 3

- Use continuous pressure to get a good maintained stretch. This stretch is very important. These muscles are most likely to get tight making the sitting position or standing difficult.

Ankle movements



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- Grasp the foot and move it in a circle, out, in, down and up.
- Grasp the foot and move it in the shape of an A, B, and C.
- Gently move the forefoot up and down.

Toe movements

- Gently bend and straighten each toe joint separately.
 - Be sure to move the big toe.
-

Back exercises with a partner

Back and neck movements

Back flexion - sitting

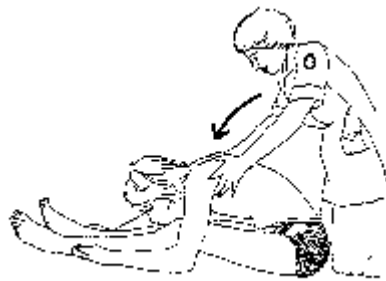
Do this stretch if spasms and/or tight muscles are present in the back.

Step 1

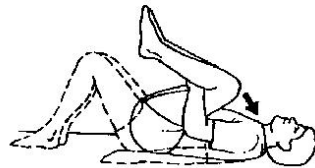
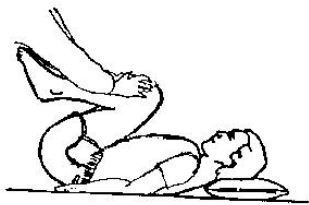
- Sit with legs out straight.

Step 2

- Lean forward, your helper may gently push your back forward as you reach towards your feet.



Back flexion – lying



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Step 1

- The helper is at your feet.
Bend both knees and hips.

Step 2

- Gently push both knees towards your chest letting the pelvis roll slightly up and off of the bed. You may be able to hold your legs up with your arms to maintain this stretch.

Back extension or straighten your back

Do these exercises only after reviewing them with your physiotherapist.

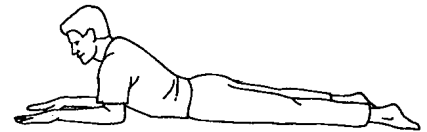
- Lie on your stomach with your head down flat.



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or

- Lie on your stomach resting on your elbows.



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You may need to put a pillow under your chest and also under your feet to keep your toes raised from the bed.

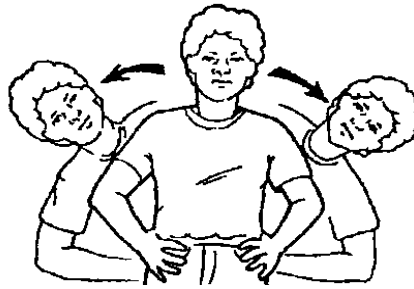


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For a prolonged stretch, stay in this position for 10 to 20 minutes.

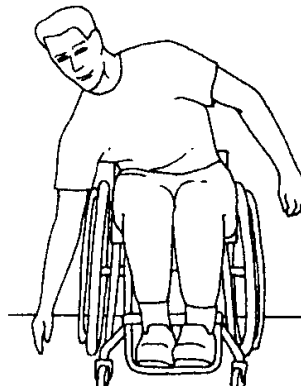
Bending to the side

- Lean to the side stretching to lean onto your elbow.



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- Reach towards the floor from the chair.

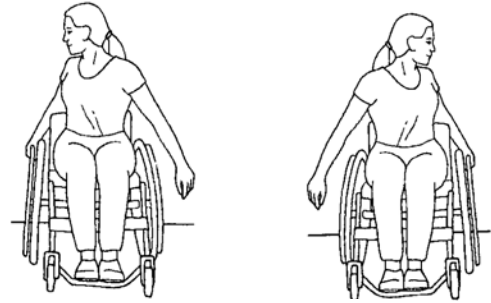


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Turning to the side

Do this either in long sitting or in your wheelchair.

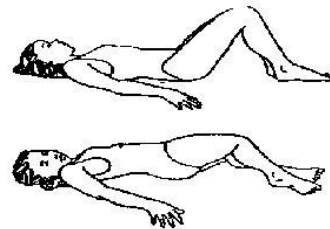
- Turn your shoulders rotating your back.



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Rotation

- In lying with your knees bent, slowly rock the knees from side to side rotating the trunk.



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Neck exercises

Flexion

- Bend your neck forward.

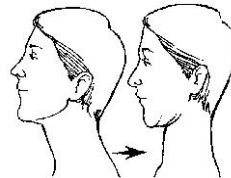


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Extension

Before doing this exercise, check with your physiotherapist as extension should not be done by everyone.

- Look up towards the ceiling (keeping your chin tucked in).



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Side Flexion

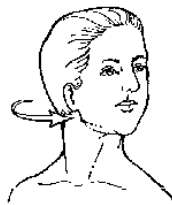
- Bend to the side (take your ear towards your shoulder).



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Rotation

- Look towards your shoulder, then turn and look towards the other side.



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Doing your own Range of Motion

If you have some or full use of your arms, you may be able to do your own range of motion, or ROM. This section shows how to do your own ROM. Your physiotherapist will teach you what and how to do these movements. Your caregivers will also be taught how to help you.

You might like to do ROM in bed, on a carpeted floor or mat, or in your wheelchair. Since upper extremity strength and range are needed to do your own ROM, the main concern is for the lower extremities and trunk.

When we talk about upper extremities, we mean arms, shoulders, hands, elbow, wrists and fingers.

When we talk about lower extremities, we mean hips, thighs, legs, ankles, feet and toes.

Even though normal strength is present, some tightness is often noticed in some upper extremity motions. This is often the case with shoulder movement. Your shoulders may be tight when you move. If your shoulder movement is painful or it feels tight, a specific stretching routine should be followed. Your physiotherapist can direct you to a good routine.

You need to learn how to maintain and protect your shoulders.

Paying careful attention to good posture and normal alignment of your body will ensure that the correct muscles are being stretched.

It is a good idea to do as much of your ROM as possible during regular activities; such as doing leg ROM while you are getting dressed.

Hip and knee exercises

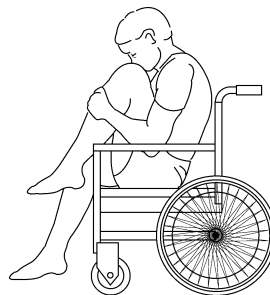
Bending your hip and knee

You can do the same movement from your wheelchair, in bed or on a mat.

If exercising from your wheelchair, make sure the chair is stable before starting.

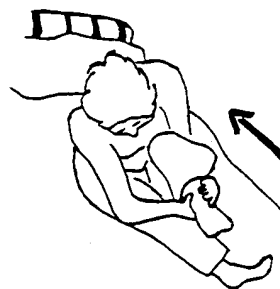
In wheelchair

- Push one or both forearms under your knee, pull up with your wrists and elbows.



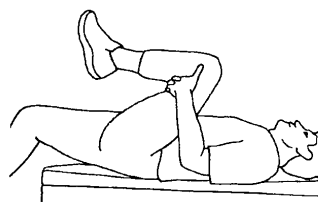
In bed

- Wrap your other arm around the outside of your lower leg and hold your hip and knee bent.



On mat

- In lying pull your leg up toward your chest hugging your leg in the bent position.



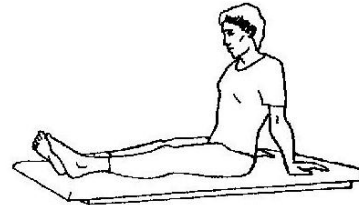
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Turning your hips

Outward turn

Step 1

- Sit with your legs out straight.



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Step 2

- Pull your legs up one at a time and place the soles of your feet together so your legs won't slide down.



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Step 3

- Push your knees down gently by leaning on them with your arms.

Step 4

- Hold for 2 minutes.
-

Bending your hips with your knee straight

Step 1

- Sit with your legs out straight.



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Step 2

- Put your arms or hand on your knees to keep them from bending and lean forward. You may not be able to reach your foot with your hand. You may do this one leg at a time.



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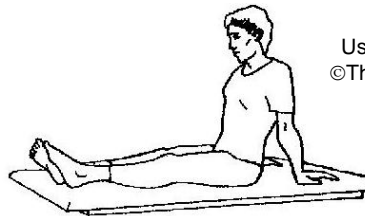
Step 3

- Hold this position for 2 minutes.
-

Moving your legs to the side

Step 1

- Sit with your legs out straight.



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Step 2

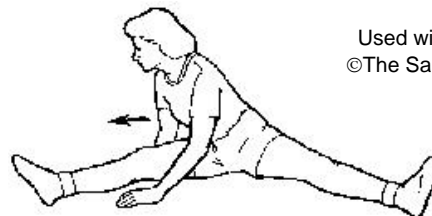
- Push your legs as far apart as you can. You may need to lean on the tops of your legs to keep your legs straight.



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Step 3

- Hold for 2 minutes.



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Turning your hip inward

Inward turn

Step 1

- Sitting, bend your hip and knee, resting your foot on the bed.



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Step 2

- Gently turn your knee inward.
Do not force this movement.



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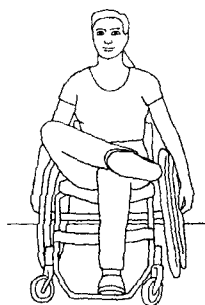
Step 3

- Hold for 2 minutes.

Ankle and toe exercises

Step 1

- Sit in your wheelchair or on a mat.



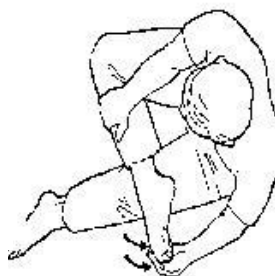
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Step 2

- Pull one knee up and cross your foot over your other leg.

Step 3

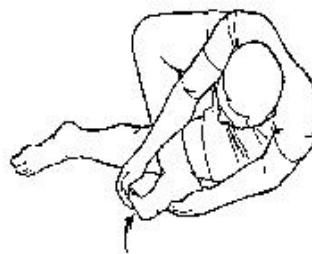
- Move the foot up, down, in and out. Move the foot as far as the joint will go. Stop when you feel some resistance to the movement.



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Step 4

- Move each toe up and down.



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Ankle

Heel cord stretch

Step 1

- Sit with your legs straight out.

Step 2

- Lean forward on one elbow and grasp the outside of your foot with your fingers.

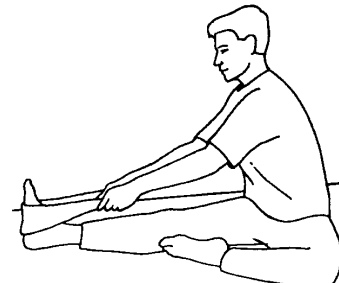


Step 3

- Pull your foot toward you and out to the side.

Heel cord stretch with a strap

- If you cannot use your fingers, or if you are not able to reach your foot, hook a strap over your foot and pull the foot upward and out with your hands.

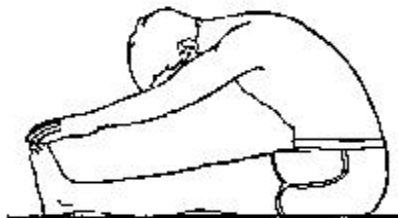


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Back exercises

Back stretch – bend forward

Do this only if you have spasms in your back. If you can reach your feet to stretch your heel cord you do not need to do this stretch. If this stretch causes back pain, do not do it.



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Step 1

- Sit with your legs straight.

Step 2

- Lean forward and hold for 2 minutes.
-

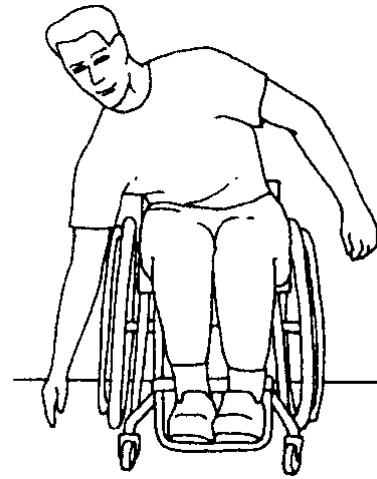
Bending to the side

Step 1

- Sit in your wheelchair. If your balance is poor, park your wheelchair in front of a bed.

Step 2

- Stretch down to one side. You can hold on to the other side of the wheelchair.



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Step 3

- Repeat on the other side.
-

Back extension

Straightening your back, stretching your hips.



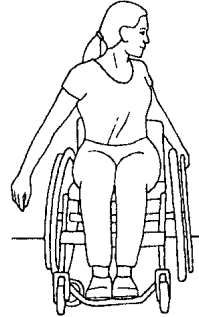
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Lie on your stomach with your head down or resting on your elbows. Try to maintain this position for 20 to 30 minutes every day, or try to sleep on your stomach.

Turning to the side in your wheelchair

Step 1

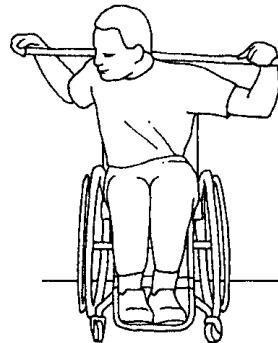
- Hold onto your chair for stability if needed or park your wheelchair facing a bed.



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Step 2

- Turn your head and shoulders toward the left twisting at your waist, then twist towards the right.
- or
- You can use a stick or pole resting across the back of your shoulders and twist the stick to turn your body.



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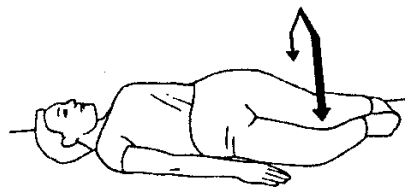
Turning to the side in your bed

Step 1

- Bend your knees and let them rotate to the side.

Step 2

- Reach with both of your arms to the other side, twisting your body.



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Neck exercises

Flexion

- Bend your neck forward.

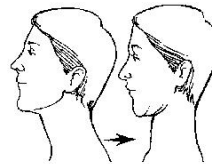


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Extension

Before doing this exercise, check with your physiotherapist as extension should not be done by everyone.

- Look up towards the ceiling (keeping your chin tucked in).



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Side Flexion

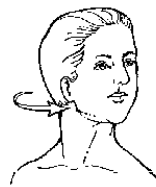
- Bend to the side (take your ear towards your shoulder).



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Rotation

- Look towards your shoulder, then turn and look towards the other side.



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