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## RANGE OF MOTION AND POSITIONING

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### Why Is Motion Important?

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Most people take free, comfortable movement for granted. Motion is meant to be smooth and painless. The ligaments, tendons, muscles and joint capsules that surround each joint in the body work best if they are used regularly.

As people get older, however, muscles gradually lose their strength, endurance and flexibility. We experience a progressive loss of muscle mass at an average rate of 4% per decade from ages 25 to 50 and 10% per decade thereafter. In addition, the joints in older people change, often becoming stiff and difficult or painful to move. Tissues in the joints sometimes become swollen or inflamed, hindering movement and making the joints more prone to injury.

As a result, people tend to move less as they age. This is the worst thing we can do. Lack of activity worsens the changes that occur with aging. Research confirms that regular exercise can slow or reverse many changes associated with the age-related loss of strength, endurance and flexibility.

When people are not physically active, every cell and system in the body is affected. The body's cells and systems begin to lose the ability to perform their specialized functions.

When movement is difficult, people experience a general decline in quality of life. Their self-image often suffers.

Lack of activity and exercise can lead to heart disease, diabetes, stroke and other health problems. Decreased mobility hinders one's ability to feed and clothe oneself, to grocery shop and to attend to personal hygiene. It promotes mental deterioration and loss of independence.

In addition, when muscles are not used, they continue to weaken. Muscle weakness increases the risk of falls and, therefore, of fractures. The risk of falling increases with age. Falls are the leading cause of injury death for people age 65 and older.

### ***What kinds of motion are best?***

There are four types of exercise. They are:

- Strength
- Stretching
- Endurance (also known as cardiovascular)
- ROM

Exercise benefits people of all ages. Regular exercise can slow or reverse decreased mobility that contributes to disease and disability in the elderly.

### **Strength**

Even a small change in muscle size can make a big difference in strength. That's why strength exercises are so important. Improving muscle size by lifting small weights helps people build their capacity to do such things as walk, climb stairs and carry a package. These kinds of activities can mean the difference between keeping one's independence and relying on others.

### **Stretching**

Stretching exercises that gently stretch the muscles and tendons help ensure flexibility. Stretching exercises do not build strength or endurance. Clinical research has demonstrated that most elderly, even the frail, benefit from a combination of flexibility and strengthening exercises. It helps them maintain function and mobility, prolong independence and improve their quality of life.

### **Endurance**

Walking, running, bicycling and swimming are examples of endurance exercise. By spending time in motion, the body and muscles become able to endure for longer periods of time, and the heart and lungs become stronger.

### **Range of motion**

ROM exercises are designed to increase flexibility. ROM is the normal amount a person's joints can be moved in certain directions or the range in which you can move a body part around a joint. Limited ROM is a reduction in the normal distance and direction through which a joint can move.

When a joint is not fully extended on a regular basis, over time it will become permanently unable to extend beyond a certain fixed position. To keep the joints, tendons, ligaments and muscles loose and flexible, ROM exercises are used. These exercises move the joints through a full ROM, helping to prevent stiffening.

### **Getting Started**

By doing a little exercise regularly, even in small 10-minute increments several times per week, it's possible to offset a variety of health problems. Exercise can help produce new red blood cells, strengthen the immune system and improve bone density. Physical activity, even at low intensity in short sessions, may reduce the risk for certain chronic diseases. Exercise also helps relieve depression.

## Range of Motion and Positioning

Older adults need to be up and moving seven days per week. They should spend time three to five days per week doing flexibility exercises or walking. Daily activities do not move joints through their full ROM.

Caregivers can help patients improve their health by encouraging them to exercise.

### Exercise tips:

- Move joints through their full ROM one to two times per day.
- Do each exercise three to 10 times.
- Move slowly. Don't bounce.
- Breathe while you exercise. Count aloud.
- Begin exercises slowly, doing each exercise a few times and gradually building up.
- Try to achieve full ROM by moving until you feel a slight stretch, but don't force a movement.
- Stop exercising if you have severe pain.
- Encourage patients with limited mobility to bear weight during transfers from bed to chair and to walk whenever possible.

### ROM exercises that can be done while seated:

- Neck (breathe with the movements, breathing out when the head moves down, breathing in when it moves up; don't let shoulders or upper body sway to the side):
  - Turn head slowly to the right and then to the left. Repeat three to four times.
  - Tilt head toward one shoulder and then toward the other shoulder. Repeat three to four times.
- Arms and shoulders:
  - Raise shoulders up toward ears and hold. Make full circles: up, forward, down and back.
  - Take a deep breath, extend arms overhead. Exhale slowly, dropping arms.
- Hands and fingers:
  - Massage each hand, one at a time. Take your time; go in between each finger.
  - Raise hands up and back. Slowly rotate hands down and around in circles.
  - Close hand in a fist. Open hands fully, stretching fingers and thumbs out wide.
- Chest and upper body:
  - With hands on waist, tilt to the right, return to center and then tilt to the left and return to center. Exhale as the movement goes down; inhale as the movement comes up. Don't allow upper body to tilt forward. Don't try to hold head up; instead, let it relax to the side.
  - Sit straight in chair with hands on your hips. Gently rock hips from side to side.

- Legs:
  - Raise right leg up and forward. Repeat with left leg.
  - Sit up straight, knees together, with legs extended forward as far as possible, keeping feet on floor. Slowly stretch forward, sliding both hands down to ankles. Hold 10 to 15 counts.
  - Grasp one knee with both arms, pull to chest and hold for five counts. Repeat with the opposite leg.
- Ankle and foot:
  - Point toes toward floor. Point toes toward ceiling. Slowly rotate feet in circles.
  - Cross right leg over left knee. Rotate foot slowly, making large complete circles — 10 rotations to the right, 10 to the left. Repeat for left leg.

## Passive Range of Motion Exercises

When an individual is able to perform ROM exercises with minimal assistance, the person is doing active ROM. When an individual is unable to perform ROM exercises, a caregiver should move the person's joints in passive ROM exercises at least once or twice per day.

Use the chart in Figure 44.1 to guide you in moving every joint in the body through its full ROM. Go slowly and be very gentle. Do not force any body part to move in any way that creates resistance or causes discomfort.

## Positioning

Everyone positions themselves when they sit, stand, move and lie down. The position we use for these activities affects circulation, joint pressure and muscle use.

People with limited mobility who sit or lie down for long periods of time are prone to skin breakdown and deterioration of muscles or nerves. Using correct positioning can prevent these problems. It is important to limit pressure over bony parts of the body by changing positions. Use pillows to keep knees and/or ankles from touching each other. Patients who are bedridden should avoid lying directly on their hip bones when on their sides. Assist patients to use positions that spread weight and pressure evenly, with pillows placed to provide support and comfort.

### KNOW THESE TERMS

- Flexion: forward bend
- Extension: straighten out
- Hyperextension: backward bend
- Lateral flexion: sideways bend
- Internal rotation: turn toward the body
- External rotation: turn away from the body
- Circumduction: move in a circle
- Abduction: move away from the body (think of “abduct” or “take away”)
- Adduction: move toward and/or across the body (think “add to the body”)
- Inversion: move or twist inward
- Eversion: move or twist outward
- Supination: turn or lie upward; face up
- Pronation: turn or lie downward; face down

A person in a chair or wheelchair should use a cushion. Avoid donut-shaped cushions because they reduce blood flow and cause tissue to swell. People sitting in chairs or wheelchairs should change positions every hour. Good posture and comfort are both important.

### ***Some basic rules of positioning***

- Always be familiar with a patient’s plan of care. Specific issues such as fractures, skin integrity and health condition will determine the type of positioning that should be done.
- Turn individuals who cannot turn themselves at least every two hours when in bed. A person in a wheelchair should change positions at least every hour. External pressure from staying in one position compresses the skin’s blood vessels and obstructs circulation, especially over the bones, leading to skin breakdown.
- When moving a patient, lift rather than drag. Dragging creates friction and heat, which can lead to skin breakdown.
- Straighten sheets and clothing to remove wrinkles.

**FIGURE 44.1 | ACTIONS FOR FULL RANGE OF MOTION**

Part	Type	Action for Full Range of Motion
Neck	Flexion	Bring chin to rest on chest
	Extension	Return head to erect position
	Hyperextension	Bend head back as far as possible
	Lateral flexion	Tilt head as far as possible toward each shoulder
	Rotation	Turn head as far as possible in a circular movement
Shoulder	Flexion	Raise arm from side position forward to position above head
	Extension	Return arm to position at side of body
	Hyperextension	Move arm behind body, keeping elbow straight
	Abduction	Raise arm from side to position above head with palm away from head
	Adduction	Lower arm sideways and across body as far as possible
	Internal rotation	With elbow flexed, move arm down until thumb is turned in and toward back
	External rotation	With elbow flexed, move arm up until thumb is upward and even with head
	Circumduction	Move arm in full circle
Elbow	Flexion	Bend elbow so lower arm moves toward shoulder and hand is level with shoulder
	Extension	Straighten elbow by lowering hand
Forearm	Supination	Turn lower arm and hand so palm is up
	Pronation	Turn lower arm so palm is down
Wrist	Flexion	Move palm toward inner aspect of forearm
	Extension	Move fingers so fingers, hands, and forearm are in same plane
	Hyperextension	Bring back surface of hand back as far as possible
	Abduction	Bend wrist toward thumb
	Adduction	Bend wrist toward fifth finger
Fingers	Flexion	Make fist
	Extension	Straighten fingers
	Hyperextension	Bend fingers back as far as possible
	Abduction	Spread fingers apart
	Adduction	Bring fingers together
Thumb	Flexion	Move thumb across palm of hand
	Extension	Move thumb straight away from hand
	Abduction	Spread thumb apart from fingers
	Adduction	Move thumb back toward hand
	Opposition	Touch thumb to each finger of same hand
Hip	Flexion	Move leg forward and up
	Extension	Move leg back beside other leg
	Hyperextension	Move leg behind body
	Abduction	Move leg away from body
	Adduction	Move leg back toward other leg and beyond, across other leg if possible
	Internal rotation	Turn foot and leg toward other leg
	External rotation	Turn foot and leg away from other leg
	Circumduction	Move leg in circle
Knee	Flexion	Bring heel back toward back of thigh
	Extension	Return leg to the floor
Ankle	Dorsal flexion	Move foot so that toes are pointed upward
	Plantar flexion	Move foot so that toes are pointed downward
Foot	Inversion	Turn sole of foot toward the body
	Eversion	Turn sole of foot away from the body
Toes	Flexion	curl toes downward
	Extension	Straighten toes
	Abduction	Spread toes apart
	Adduction	Bring toes together

### ***Bed positioning tips***

- Position the spine in alignment.
- Position the hips straight without leg rotation.
- Position the upper extremities away from the body.
- Support the arms when the patient is lying on his or her side.
- Keep the knee joints flexed 15 degrees when the patient is supine (lying on the back).
- Turn the patient from side to side and prone (lying face down) on a scheduled basis.
- Keep the head in a straight, midline position.

### ***Positions***

- Supine (on back)
  - Place a pillow under the head.
  - Place pillows under both arms. When bedridden patients lie on their back with forearms and palms facing down, pressure can damage wrist nerves.
  - Place pillows under legs from midcalf to ankle to keep heels off the bed. Do not put a pillow under the knees only, as this will cause the heel to rub against the bed.
  - Hand rolls (roll washcloths and place in hands to prevent freezing of finger joints).
  - Use foot-positioning devices such as shoes, boots and footboards.
- Lying on side
  - Position patient up in bed if needed.
  - Position patient to one side of bed. Turn patient by sliding arm under the shoulders and head. Lift upper body over, then move hips and legs.
  - Cross the patient's top ankle over the bottom ankle, or flex top knee.
  - Turn the patient by placing one hand on the shoulder and one hand on the hip.
  - Place pillow under head and another behind patient's back.
  - Support flexed extremities with pillows and positioning devices.
  - Ensure proper body alignment.
- Prone (on stomach)
  - Lift patient toward you.
  - Bend arm up around head.
  - Place other arm at side.

- Place pillow under abdominal muscles.
- Roll patient on stomach.
- Support ankles with pillows.
- Positioning while seated
  - Seat patient in a chair that supports the back.
  - Keep ears in line with the hips.
  - Support the curve of the lower back with a rolled up towel or lumbar roll.
  - Knees should be level with the hips.
  - Feet should be flat on the floor or on a footrest.
- Positioning while standing (to help patients learn balance when using walkers or canes)
  - Position the feet a few inches apart.
  - Position the hips in front of the ankles.
  - Position the shoulders over the hips.
  - Keep the head balanced over the hips.
  - Keep the spine straight.

ROM exercises and proper positioning can help prevent the permanent disabilities and life-threatening complications that often result from immobility. Caregivers need to intervene to prevent physical decline and deterioration. We can accomplish this by keeping patients moving.