

MODULE 5

THE EFFECTS OF IMMOBILITY

Introduction

The effects of both regular exercise and immobility on major body systems are discussed in this lesson.

The body was designed for motion. Most people move and exercise their joints through the normal activities of daily living.

When any joint cannot be moved in this way, the patient or nurse must move it at regular intervals to maintain muscle tone and joint mobility.

Body Immobility Impact

- Regular exercise contributes to a healthy body; therefore, immobility has a negative effect.
- A joint that has not been moved sufficiently can begin to stiffen within 24 hours and will eventually become inflexible.
- With longer periods of joint immobility, the tendons, and muscles can be affected as well.
- Range of motion (ROM) exercises are ones in which a nurse or patient moves each joint through as full a range as is possible without causing pain.

Learning Outcomes

After completing this lesson, the learner should be able to:

- Identify the effects of immobility on the body.
- Identify the purposes of exercise for the immobile patient.
- Define the five types of exercises.
- Define the nine types of body movement.
- Identify guidelines for range-of-motion exercises.

The effects and impact of immobility on the body systems are outlined as follows:

- ✓ Cardiovascular System
- ✓ Respiratory System
- ✓ Musculoskeletal System
- ✓ Nervous System
- ✓ Gastrointestinal System
- ✓ Urinary System
- ✓ Psychosocial Functioning

The effects of immobility on the Cardiovascular system are as follows:

- Venous stasis is caused by prolonged inactivity that restricts and slows venous circulation.
- Muscular activity, especially in the legs, helps move blood toward the central circulatory system.
- Increased cardiac workload due to increased viscosity from dehydration and decreased venous return.
- The heart works more when the body is resting, probably because there is less resistance offered by the blood vessels and because there is a change in the distribution of blood in the immobile person.

Cardiovascular System continued

Additional effects of immobility on the Cardiovascular system are as follows:

- ✓ During periods of immobility, calcium leaves the bone and enters the blood, where it influences blood coagulation.
- ✓ Orthostatic hypotension is probably due to a decrease in the neurovascular reflexes, which normally causes vasoconstriction, and to a loss of muscle tone.
- ✓ The result is that blood pools and does not squeeze from veins in the lower part of the body to the central circulatory system.
- ✓ The immobile person is more susceptible to

Respiratory System

*The effects of immobility on the **Respiratory system** are as follows:*

Hypostatic pneumonia. The depth and rate of respiration and the movement of secretions in the respiratory tract are decreased when a person is immobile. The pooling secretions and congestion predispose to respiratory tract infections.

Signs and symptoms include:

- Increased temperature.
- Thick copious secretions.
- Cough.
- Increased pulse.
- Confusion, irritability, or disorientation.
- Sharp chest pain.
- Dyspnea.

Atelectasis. When areas of lung tissue are not used over some time, incomplete expansion or collapse of lung tissue may occur.

Impaired coughing. Impairment of the coughing mechanism may be due to the patient's position in bed decreasing chest cage expansion.

Musculoskeletal System

*The effects of immobility on the **Musculoskeletal system** are as follows:*

- ✓ Muscle atrophy. Disuse leads to decreased muscle size, tone, and strength.
- ✓ Contracture. Decreased joint movement leads to permanent shortening of muscle tissue, resistant to stretching.
- ✓ The strong flexor muscles pull tight, causing a contraction of the extremity or permanent position of flexion.
- ✓ Ankyloses: Consolidation and immobility of a joint in a particular position due to contracture.

Nervous System

The effects of immobility on the Nervous System are as follows:

- The altered sensation is caused by prolonged pressure and continual stimulation of nerves.
- Usually, pain is felt at first, and then the sensation is altered, and the patient no longer senses the pain.
- Peripheral nerve palsy.

Gastrointestinal System

The effects of immobility on the Gastrointestinal System are as follows:

- ✓ Disturbance in appetite caused by the slowing of the gastrointestinal tract, secondary immobility, and decreased activity resulting in anorexia.
- ✓ Altered digestion and utilization of nutrients resulting in constipation.
- ✓ Altered protein metabolism.
- ✓ Integumentary System. Risk of skin breakdown, which leads to necrosis and ulceration of tissues, especially in bony areas.

Additional impact of Immobility on Metabolism.

Psychosocial Functioning.

The effects of immobility on Psychosocial Functioning are as follows:

- Decrease in self-concept and increase in sense of powerlessness due to inability to move purposefully and dependence on someone for assistance with simple self-care activities.
- Body image distortions (depends on diagnosis).
- Decrease in sensory stimulation due to lack of activity, and altered sleep-wake pattern.
- Increased risk of depression, which may cause this patient to become apathetic, possibly because of decreased sensory stimulation; or the patient may exhibit altered thought.

Exercise for the Immobile Patient

The purpose of Exercise for Immobile Patients is as follows:

- To maintain joint mobility by putting each of the patient's joints through all possible movements to increase and/or maintain movement in each joint.
- To prevent contracture, atony (insufficient muscular tone), and atrophy of muscles.
- To stimulate circulation, preventing thrombus and embolus formation.
- To improve coordination.
- To increase tolerance for more activity.
- To maintain and build muscle strength.

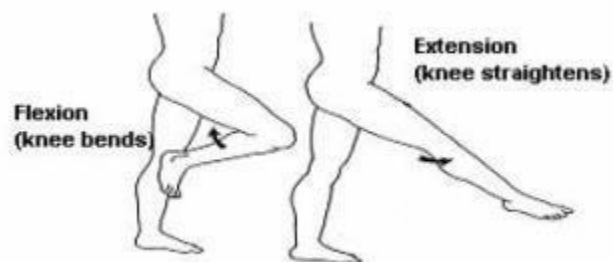
Type of Exercises

- **Passive:** These exercises are carried out by the nurse, without assistance from the patient.
- **Passive exercises** will not preserve muscle mass or bone mineralization because there is no voluntary contraction, lengthening of muscle, or tension on bones.
- **Active Assistive.** These exercises are performed by the patient with assistance from the nurse.
- **Active assistive exercises** encourage normal muscle function while the nurse supports the distal joint.
- **Active:** Active exercises are performed by the patient, without assistance, to increase muscle strength.
- **Resistive:** These are active exercises performed by the patient by pulling or pushing against an opposing force.
- **Isometric:** These exercises are performed by the patient by contracting and relaxing muscles while keeping the part in a fixed position.
- **Isometric exercises** are done to maintain muscle strength when a joint is immobilized. Full patient cooperation is required.
- **Flexion:** The state of being bent. The cervical spine is flexed when the chin is moved toward the chest.
- **Extension:** The state of being in a straight line. The cervical spine is extended when the head is held straight.

Example:

Flexion – Knee bends

Extension – Knee straightens



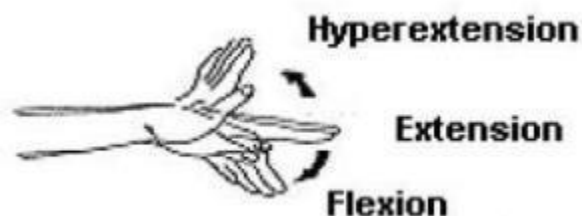
Types of Body Movement

Hyperextension. The state of exaggerated extension.

The cervical spine is hyperextended when the person looks overhead, toward the ceiling.

Example:

Hyperextension of the hand extension of the hand
Flexion of the hand



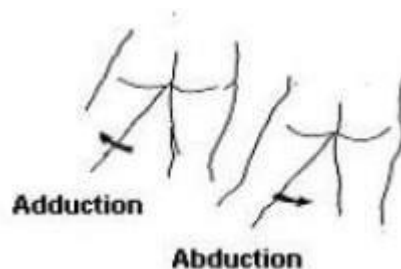
Abduction. Lateral movement of a body part away from the midline of the body. The arm is abducted when it is held away from the body.

Adduction. Lateral movement of a body part toward the midline of the body. The arm is adducted when it is moved from an outstretched position toward the body.

Example:

Adduction of the leg

Abduction of the leg

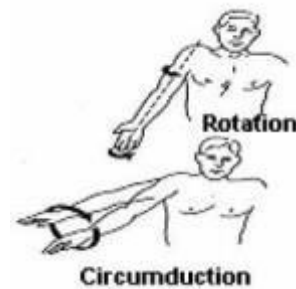


Rotation. Turning off a body part around an axis. The head is rotated when moved from side to side to indicate “no.”

Circumduction. Rotating an extremity in a complete circle. Circumduction is a combination of abduction, adduction, extension, and flexion.

Example:

Rotation of the arm Circumduction of the arm

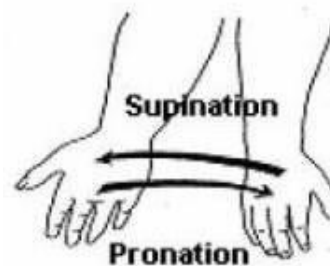


Supination. The palm or sole is rotated in an upward position.

Pronation. The palm or sole is rotated in a downward position.

Example:

Supination of the hand Pronation of the hand



Guidelines for Range and Type of Motion Exercises

- Plan when range of motion exercises should be done.
- Plan whether exercises will be passive, active-assistive, or active.
- Involve the patient in planning the program of exercises and other activities because he/she will be more apt to do the exercises voluntarily.
- Except, the patient's heart rate and respiratory rate increase during exercise.
- Range-of-motion exercises should be done at least twice a day.

Guidelines for Range of Motion Exercises during the Bath During

- ✓ During the bath, areas are exposed so that the joints can be both moved and observed.

- ✓ The warm bath water relaxes the muscles and decreases the spasticity of the joints.

Guidelines for Range of Motion Exercises before the Bath

Another appropriate time might be before bedtime.

- ✓ The joints of helpless or immobile patients should be exercised once every eight hours to prevent contracture from occurring.
- ✓ Joints are exercised sequentially, starting with the neck and moving down.
- ✓ Put each joint needing exercise through the range of motion procedure a maximum of three times, and preferably five times.

Guidelines for Range of Motion Exercises Before the Bedtime

- ✓ Avoid overexerting the patient; do not continue the exercises to the point that the patient develops fatigue.
- ✓ Some exercises may need to be delayed until the patient's condition improves.
- ✓ Start gradually and move slowly using smooth and rhythmic movements appropriate for the patient's condition.
- ✓ Support the extremity when giving passive exercise to the joints of the arm or leg.
- ✓ Stretch the muscles and keep the joint flexible.

Guidelines for Range of Motion Exercises

- Move each joint until there is resistance, but never force a joint to the point of pain.
- Keep friction at a minimum to avoid injuring the skin.
- Return the joint to its neutral position.
- Use passive exercises as required, however, encourage active exercises when the patient can do so.

Contraindications to Range of Motion Exercises

- ✓ Heart and Respiratory Diseases. Range of motion exercises require energy and tend to increase circulation.
- ✓ Increasing the level of energy expended or increasing the demand for circulation is potentially hazardous to patients with heart and respiratory diseases.
- ✓ Connective Tissue Disorders. Range of motion exercises but stress on the soft tissues of the joint and the bony structures.
- ✓ These exercises should not be performed if the joints are swollen or inflamed or if there has been an injury to the musculoskeletal system in the vicinity of the joint.
- ✓ Encourage the immobile patient to participate as fully as possible so that he feels involved in the process.
- ✓ Always explain to the patient what you are about to do and enlist his cooperation.
- ✓ To avoid strain, remember to maintain your proper body mechanics as you carry out the exercises for the patient.
- ✓ The overall nursing goal is to promote the maximum degree of mobility for the patient who cannot engage in the normal activities of daily living and prevent or reduce the effects of immobility.
- ✓ Performing range of motion exercises can often save the patient a lengthy rehabilitation.