Therapeutic Exercise

Learning Objectives

On completion of this chapter, the reader will

▪ List at least five benefits of regular exercise.	▪ Define fitness.
▪ Describe how to calculate person's target HR.	▪ Define metabolic energy equivalent.
▪ Name at least two methods of fitness testing.	▪ Identify seven factors that interfere with fitness.
▪ Differentiate fitness exercise from therapeutic exercise.	
▪ Differentiate isotonic exercise from isometric exercise.	
▪ Give at least one example of isotonic and isometric exercises.	
▪ Differentiate between active exercise and passive exercise.	
▪ Discuss how and why range-of-motion exercises are performed.	
▪ Provide at least two suggestions for helping older adults become or stay physically active.	

Exercise (purposeful physical activity) is beneficial to people of all age groups, and the health risks of a sedentary lifestyle are well documented. This unit will addresses techniques for improving health and maintaining or restoring muscle and joint function by promoting exercise. Because exercise must be individualized, nurses are responsible for assessing each person's fitness level before initiating an exercise program with a client.	**Benefits of Physical Exercise** ▪ Improved cardiopulmonary function ▪ Reduced blood pressure ▪ ↑ muscle tone and strength ▪ Greater physical endurance ▪ ↑ lean mass and weight loss ▪ Reduced blood glucose level ▪ ↓ low-density blood lipids ▪ Improved physical appearance ▪ ↑ bone density ▪ Regularity of bowel elimination ▪ Promotion of sleep ▪ Reduced tension and depression

FITNESS ASSESSMENT

Fitness ➔ capacity to exercise. ***Sedentary lifestyle***, ***health problems***, ***compromised muscle & skeletal function***, ***obesity***, ***advanced age***, ***smoking*** & ***high BP*** can **impair client's fitness** & **stamina**. They could result in injury during exercise. Therefore before client begins an exercise program, **assessment** of his/her fitness level **is necessary**. **Assessment techniques** include measuring **body composition**, evaluating **vital signs**, and performing **fitness tests**.

1. Body Composition

It is the **amount of body tissue that is lean** versus **amount that is fat**. **Determining factors** include **anthropometric measurements** as ***height***, ***weight***; ***body-mass index***, ***skinfold thickness*** & ***mid-arm muscle circumference***. Overweight or obese people are less fit than their leaner counterparts & need to **proceed gradually** when initiating an exercise program.

2. Vital Signs

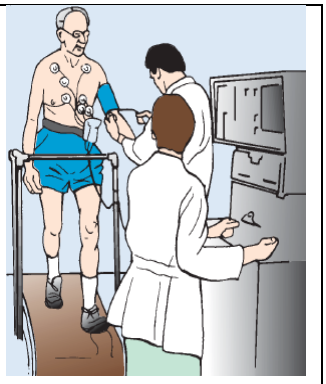
It reflects person's physical status. **Elevated** PR, RR, & BP **while resting** are **signs** that person may have **life-threatening cardiovascular symptoms during exercise**. After a period of modified exercise, vital signs may↓ thus ➔ reducing potential for heart-related complications

3. Fitness Tests

- Provides objective measure of **<u>current fitness level</u>** & potential for **<u>safe exercise</u>**.
- **<u>Help to establish safe parameters</u>** for level & duration of exercise.
- Two methods of fitness testing are ***<u>stress ECG</u>*** and an ***<u>ambulatory ECG</u>***.
- Another is a **submaximal fitness test (**test that does not stress person to exhaustion). Ex **step test** & **walk-a-mile test**. Submaximal tests validity **less reliable** than ECG test

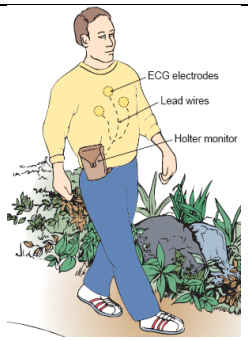
Stress Electrocardiogram (stress ECG)

- Test electrical conduction through heart ***during maximal activity***
- Client ***first walks slowly*** on flat ***treadmill***. As test progresses, treadmill speed & incline **increase**.
- The examiner notes client's ***heart rate*** & ***rhythm***, ***BP***, ***breathing***, and symptoms as ***dizziness*** and ***chest pain***.
- ***Peripheral oxygenation*** measured by **pulse oximeter**
- Examiner **stops test** if client develops ***abnormal heart rhythm***, **cardiac ischemia**, ***elevated BP*** or ***exhaustion***.



Ambulatory Electrocardiogram (ECG)

- It is a ***continuous heart rate*** & ***rhythm record*** during ***normal activity***. It requires client to **wear (Holter monitor for 24 hour**s.
- It is used when the person had ***prior cardiac-related symptoms*** as ***chest pain***, or ***major health risks*** that ***contraindicate a stress electrocardiogram***.
- It assesses **heart's response** to **normal activity** & evaluates person response to **<u>cardiac rehabilitation</u>** & **<u>medical therapy</u>**.



- **Holter monitor** is connected to **chest leads** that attached to a **strap** or **carried in pocket**.
- The client **should not shower** or **swim**; a sponge bath is permitted. The client also should **avoid <u>*magnets*</u>**, **<u>*metal detectors*</u>**, **<u>*electric blankets*</u>**, and **<u>*high-voltage areas*</u>**.
- Client ***keeps diary*** of ***time & type of activities performed***, ***medication's time*** & when **experienced symptoms**.
- After test period, client ***returns monitor***, then a computer & physician check the electrically recorded information. The physician compares client's diary with ECG.
- Results help to determine if ***oxygenation*** to heart muscle was ***temporarily impaired during activity*** or if ***abnormal heart rhythm developed***. Either finding indicates exercise

should begin at very low intensity & short duration.

Step Test

- A **step test** is a submaximal fitness test involving a ***timed stepping activity***.
- Person ***steps up*** & ***down on platform*** of prescribed height (**20"** men, **16"** women) for **3 - 5 minutes *at least 76 steps/minute***. A ***step up or down*** is considered ***one step***.
- The ***time is shortened*** when client ***no longer can sustain prescribed rate*** or develops ***discomfort***. Examiner uses ***metronome*** & ***stopwatch*** to keep track of the ***rate & time.***
- Examiners calculate client's **recovery index** (guide to determine fitness level) by taking a **30-second pulse rate <u>1</u>**, **<u>2</u>** & **<u>3 minutes</u>** after test & using the formula:

$$\text{Recovery index} = \frac{(100 \text{ x test duration in seconds })}{(2 \text{ x total of } 30 - \text{seconds pulse assessment})}$$

- **Fit person** has **smaller decline** in HR at each assessment. Another fitness indicator is how **<u>close pulse rate at the end</u>** of recovery compares with the **<u>pretest pulse rate</u>**.
- Personnel **certified in CPR** & use of **defibrillator** should be **available**.

Cardiovascular Endurance Fitness Levels	
Score	**Fitness Classification**
≥90	Excellent
89–80	Good
79–65	Average
64–56	Below average
≤55	Poor

Walk-a-Mile Test

It devised by the American College of Sports Medicine (2000), ***to measure the time it takes a person to walk 1 mile***. The person is instructed to ***walk 1 mile on a flat surface as fast as possible***. C***alculates time from start to finish*** and ***interprets results*** using ***guidelines*** below

Evaluation criteria for the walk-a-mile test		
Men Performance time	**Women Performance time**	**Fitness level**
≥17.5 minutes	≥16.5 minutes	Needs work
≤15 minutes	≤14 minutes	Average
≤11.75 minutes	≤10.25 minutes	Good

EXERCISE PRESCRIPTIONS

The prescription for an exercise program involves determining person's target heart rate and metabolic energy equivalents (METs) of particular activities based on person's fitness level.

Target Heart Rate

- **It means** the ***goal for heart rate during exercise***. It is determined by first calculating person's **Maximum Heart Rate** (**MHR**) (highest limit for heart rate during exercise).

- **MHR** is calculated by subtracting a **person's age from 220**. Thus, a 20-year-old has a **MHR** of 200 beats per minute (bpm), whereas a 50-year-old has a **MHR** of 170 bpm.
- The target heart rate is **60%-90%** of **MHR**.
- **Beginners** should ***not exceed 60%***, **intermediates** can exercise at ***70% to 75%,*** and **competitive athletes** can tolerate ***80% to 90%*** of their maximum heart rate.
- Exercise at target rate for **15 minutes** (exclude warm up & cool down) **3 or more times/week *strengthens*** heart muscle & ***promotes*** the ***use of fat reserves*** for energy.
- Exercising beyond the target heart rate reduces endurance by increasing fatigue.

TYPES OF EXERCISE

Fitness Exercise

- **It is *physical activity performed by healthy adults***. Fitness exercise **develops and maintains *cardiorespiratory function***, ***muscular strength*** & ***endurance***. The two categories of fitness exercise are **isotonic** and **isometric**.
- Isotonic exercise is activity that involves ***movement*** and ***work***. The prime example is **aerobic exercise,** which involves **rhythmically** moving all body parts at ***moderate*** to ***slow speed*** without ***hindering the ability to breathe***.
- Isometric exercise consists of ***stationary exercises*** performed against resistive force. **Examples include *body building*, *weight lifting***, and ***less intense activities*** as simply ***contracting*** and ***relaxing muscle groups*** while sitting or standing.
- Isometric exercises ***increase muscle mass***, ***strength*** & ***tone*** and define muscle groups.
- They ***improve blood circulation***; but ***don't promote cardiorespiratory function***. In fact, strenuous isometric exercises ***elevate blood pressure temporarily***.

Metabolic Energy Equivalent

- Because fitness levels vary, exercises also are prescribed according to their **metabolic energy equivalent** (measure of energy & O_2 consumption during exercise).
- This is the prescribed amount that a person's cardiovascular system can safely support.
- Low to vigorous physical activities and

Levels Of Physical Activity	
MET	**Examples Of Activities**
1 MET	Sewing; Dressing; Watching TV
1–2 METs	Walking 1 mph ; Bowling
2–3 METs	Golfing with a cart Mowing lawn **ć** power mower
3–4 METs	Playing badminton (doubles) Raking leaves
4–5 METs	Slow swimming; Lifting 50 lbs
5–6 METs	Square dance; Shoveling snow
6–7 METs	Water skiing; Moving furniture
7–8 METs	Playing basketball Play noncompetitive handball
8–9 METs	Cross-country skiing

their approximate METs are listed in Table.		Playing contact football
	≥10 METs	Running 6 mph or faster

Therapeutic Exercise

- **It** is activity performed by people with ***health risks*** or ***treated for existing health problem***. Clients perform therapeutic exercise to ***prevent health-related complications*** or to ***restore lost functions*** (e.g Perform Leg Exercise & Strengthening Pelvic Floor Muscles). It may be **isotonic** or **isometric**; isotonic (***active*** or ***passive***).

Active Exercise

- **It** is therapeutic activity ***performs independently*** by client after proper instruction. **Example**, mastectomy clients learn to exercise arm on surgical side by ***combing hair***, ***squeezing soft ball***, ***finger-climbing*** wall & ***swinging a rope attached to a doorknob***.
- It is often ***limited to a particular part of the body*** that is in a weakened condition.

Passive Exercise

- **Passive exercise** is therapeutic activity that the ***client performs with assistance*** and is provided when a ***client cannot move one or more*** body ***parts***. **Example** ***comatose*** or ***paralyzed clients*** from a stroke or spinal injury need the nurses to perform exercises that ***maintain muscle tone*** & ***flexible joints***. Ex ***range-of-motion exercise***.

RANGE-OF-MOTION EXERCISES

Range-of-motion (ROM) **exercises** are therapeutic activities that move the joints.

They are performed for the following reasons:

- To ***assess joint flexibility*** before initiating an exercise program
- To ***maintain joint mobility*** and ***flexibility*** in inactive clients
- To ***prevent ankylosis*** (permanent loss of joint movement)
- To ***stretch joints*** before performing more strenuous activities
- To ***evaluate the client's response to a therapeutic exercise program***

CONTINUOUS PASSIVE MOTION MACHINE

- It is ***electrical device*** used as a s***upplement or substitute for manual ROM exercise***. It is ***preferred during rehabilitation*** of burns clients or ***knee or hip replacement surgery*** (controls joint movement degree & can ↑ it throughout recovery).
- In addition to ***restoring*** & ***increasing joint ROM***, movement created by the machine ***prevents the pooling of venous blood***, thus ***decreasing the risk of blood clots***. Also it ***accelerates wound healing*** because the synovial fluid circulates around joint.
- Most machines produce ***0° to 110° of motion 2 to 10 times per minute***.
- Initially the nurse ***sets the machine*** at ***very low speeds*** and ***degrees of movement*** it is common to **begin with 5° - 10° of flexion** cycling **twice a minute** at least **six times a**

day. The nurse ***increases the settings each day*** as the client's tolerance builds. The nurse positions the client's extremity in the machine and programs the speed and the degree of desired joint flexion according to the physician's exercise prescription.

Joint Positions	
Position	**Description**
Flexion	Bending so as to decrease the angle between two adjoining bones
Extension	Straightening so as to ↑ angle between two adjoining bones up to 180°
Hyperextension	Increasing the angle between two adjoining bones more than 180°
Abduction	Moving away from the midline
Adduction	Moving toward the midline
Rotation	Turning from side to side as in an arc
External rotation	Turning outward, away from the midline of the body
Internal rotation	Turning inward, toward the midline of the body
Circumduction	Forming a circle
Pronation	Turning downward
Supination	Turning upward
Plantar	flexion Bending toward the sole of the foot
Dorsiflexion	Bending the foot toward the dorsum or anterior side
Inversion	Turning the sole of the foot toward the midline
Eversion	Turning the sole of the foot away from the midline

NURSING IMPLICATIONS

Few people exercise sufficiently to promote optimal health. With this in mind, the Department of Health and Human Services has established goals and strategies for improving the health of U.S. citizens. Nurses can set an example for others in the community by improving their own physical fitness and encouraging others to do so.

For people with medical disorders, nurses may identify one or more of the following nursing diagnoses that are treated with activity or an exercise regimen:

- Impaired Physical Mobility
- Risk for Disuse Syndrome
- Activity Intolerance
- Unilateral Neglect
- Risk for Delayed Surgical Recovery

Range-of-Motion (ROM) Exercises

Introduction

There are several types of exercise that promote physical and psychologic health. Exercise (purposeful physical activity) is beneficial to people of all age groups, and the health risks of a sedentary lifestyle are well documented. To assist the patient to decrease pain, increase circulation when little resistance is applied & increase strength, endurance & circulation when adequate resistance (60%–80% maximum capacity) is applied.

Time allowed: 5-7 minutes for each extremity

Practical skills outcomes:

At the end of this procedure student will be able to perform range-of-motion (ROM) exercises effectively and safely.

Definitions & terminology:

- Active-assistive range-of-motion exercises performed by the client with the assistance of the nurse.
- Active range-of-motion exercises performed independently by the client.
- Exercise: purposeful physical activity
- Range-of-motion exercises: therapeutic activities that move the joints.
- Therapeutic exercise is activity performed by people with health risks or being treated for an existing health problem.
- Pressure ulcer: localized area of tissue necrosis that develops when soft tissue is compressed between a bony prominence and an external surface for a prolonged period of time; also known as bedsore or decubitus ulcer.

Indications

▪ Maintains present level of functioning and mobility of joints and muscles.	
▪ Facilitates circulation and prevents vascular complications of immobility.	
▪ To maintain joint mobility and flexibility in inactive clients	
▪ Improved cardiopulmonary function	▪ Regularity of bowel elimination
▪ Increased muscle tone and strength	▪ Reduced blood pressure
▪ Increased lean mass and weight loss	▪ Greater physical endurance
▪ Decreased low-density blood lipids	▪ Reduced blood glucose level
▪ Improved physical appearance	▪ Increased bone density
▪ Promote sleep & Reduced tension & depression	▪ Facilitates comfort.

Safety precautions

- Follow the safety guidelines and agency policy regarding safety precautions.
- Site of resistance application is usually distal to segment desired to be strengthened.
- Determine need to educate caregivers about procedure.

Quality control

- Movements should be performed in a pain-free ROM.
- Know joint's normal range and extent to which it can be moved.
- Maintain patient's privacy and comfort
- Include caregiver because they may be participating when patient goes home.

Position	Description
Flexion	Bending so as to decrease the angle between two adjoining bones
Extension	Straightening so as to increase the angle between two adjoining bones up to 180°
Hyperextension	Increasing the angle between two adjoining bones more than 180°
Abduction	Moving away fROM the midline
Adduction	Moving toward the midline
Rotation	Turning from side to side as in an arc
External rotation	Turning outward, away from the midline of the body
Internal rotation	Turning inward, toward the midline of the body
Circumduction	Forming a circle
Pronation	Turning downward
Supination	Turning upward
Plantar flexion	Bending toward the sole of the foot
Dorsiflexion	Bending the foot toward the dorsum or anterior side
Inversion	Turning the sole of the foot toward the midline
Eversion	Turning the sole of the foot away from the midline

Instruments & materials

No special equipment is needed, except gloves when contact with body fluids is possible.

Procedures (implementation)

Assessment

- Review the medical record and nursing plan for care. Determines whether activity problems have been identified and measures for treating any
- Assess the client's level of activity and joint mobility. Indicates whether, and the extent to which, joints should be passively exercised
- Assess the client's understanding of the hazards of inactivity and purposes for exercise. Determines the type and amount of health teaching needed

Nursing diagnosis

- Impaired physical mobility related to trauma, surgery, or neuromuscular deficit
- Potential for injury related to improper ROM techniques used as extra force on a joint
- Risk for disuse syndrome

- Unilateral neglect
- Risk for delayed surgical recovery
- Activity intolerance

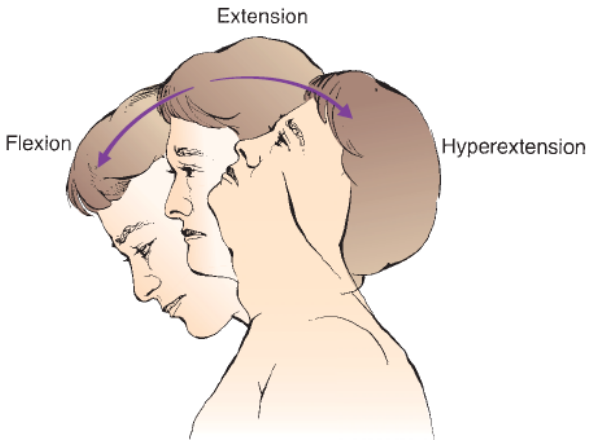
Expected outcomes

● patient will experience comfort
● maintenance or enhancement of ROM
● assist in circulation and healing

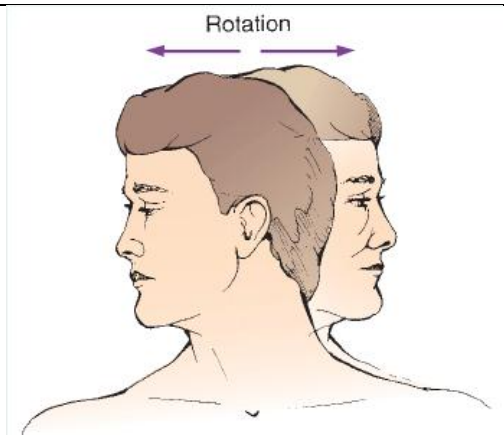
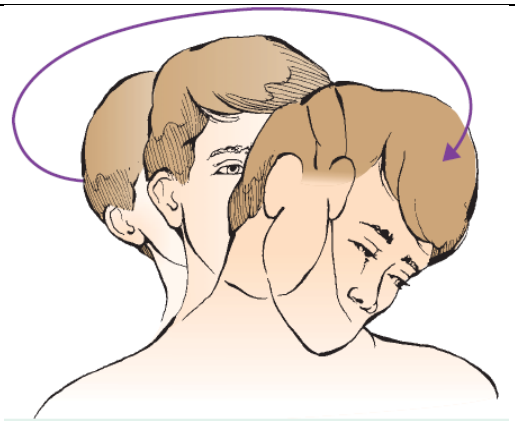
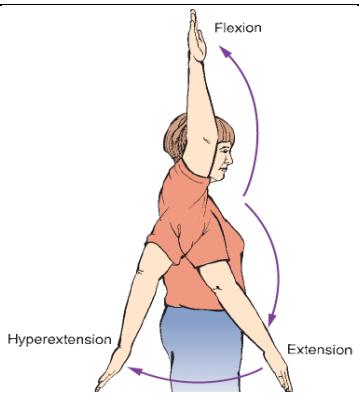
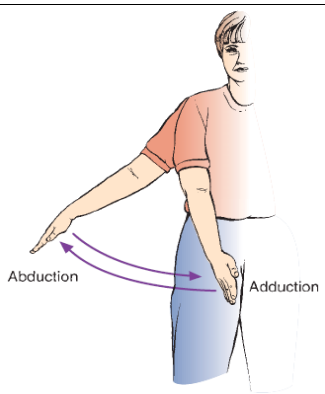
Client education needed:

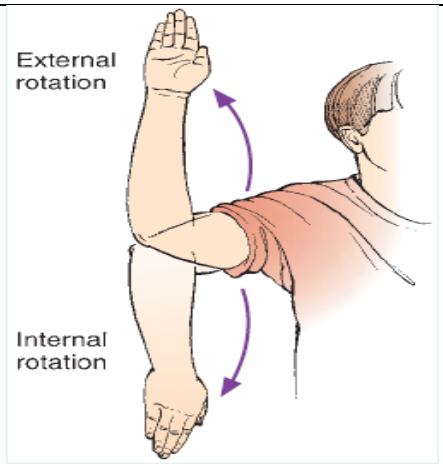
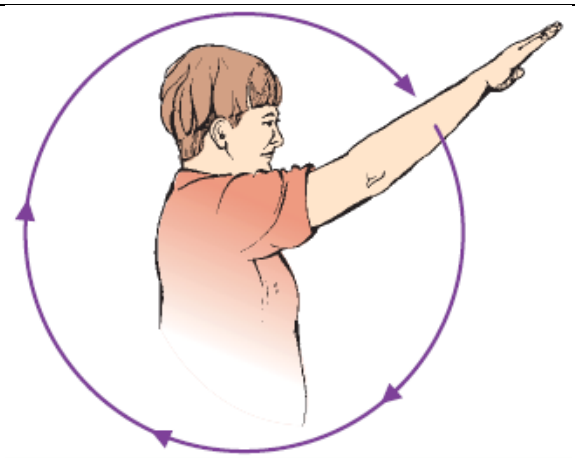
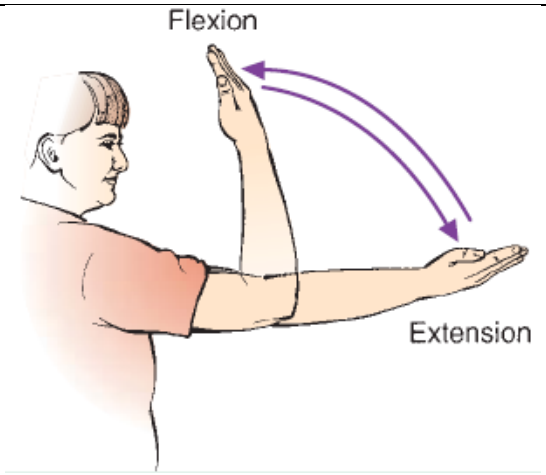
1. Explain who you are and the purpose of ROM exercises.
2. Explain that ROM should not be painful and that any increase in pain or other symptoms should be reported immediately.
3. Discuss anticipated benefits of ROM exercises.
4. Use verbal cues to encourage the client to participate as actively as possible.
1. 5. Verbally identify to the client each joint and movement to be exercised in turn.

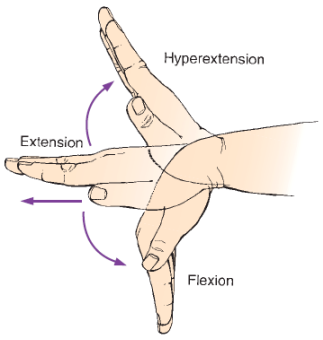
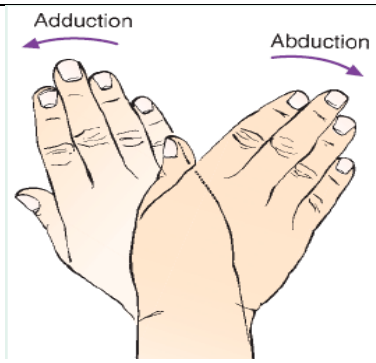
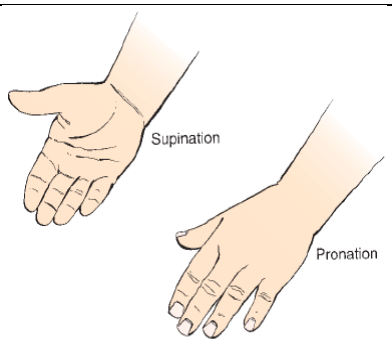
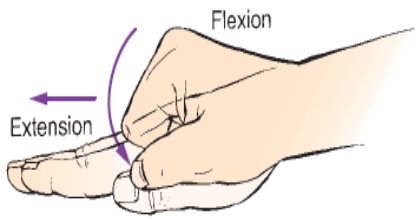
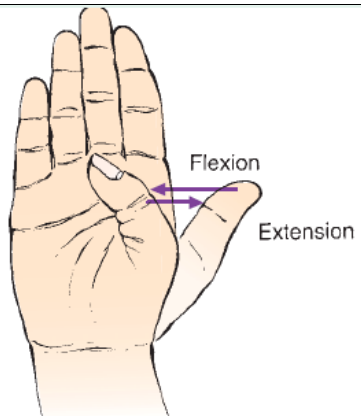
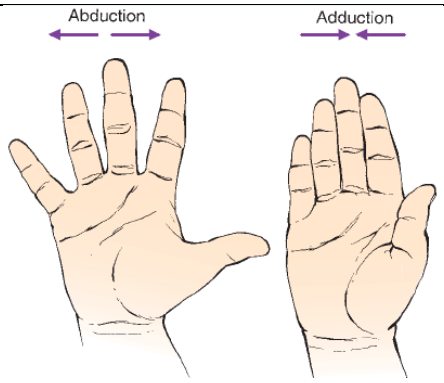
Action	**Rational**
1. Explain the procedure for performing ROM.	Reduce anxiety & promote cooperation
2. Consult with client on when ROM exercises may be best performed.	Shows respect for independent decision-making
3. Suggest performing ROM during a time that requires general activity, such as bathing.	Demonstrates efficient time management
4. Perform ROM exercises at least twice a day.	Promotes recovery or maintains functional use
5. Exercise each joint at least 2-5 times during each exercise period.	Increases exercise benefits
6. Wash your hands or perform an alcohol-based hand rub	Reduces the potential for transferring microorganisms
7. Help the client to a sitting or lying position.	Promotes relaxation & access to body
8. Pull the privacy curtains.	Demonstrates respect for modesty
9. Drape the client loosely or suggest loose-fitting underwear or shorts.	Avoids exposing the client
10. Begin at the head.	Facilitates organization
11. Support the client's neck and bring the chin toward the chest and then as far back in the opposite position as possible.	Flexes and hyperextends the neck

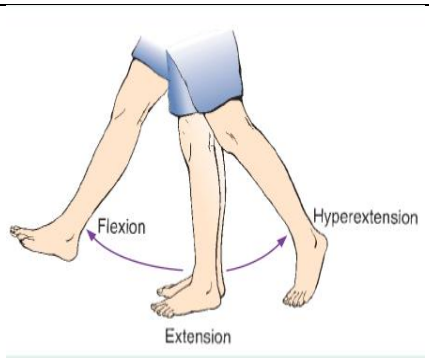
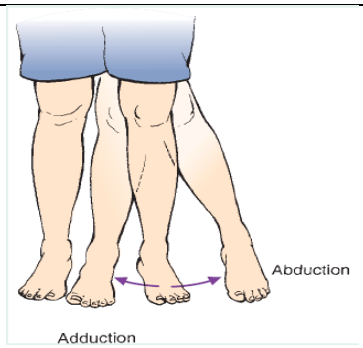
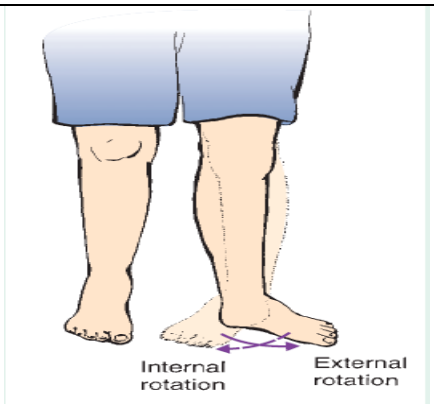
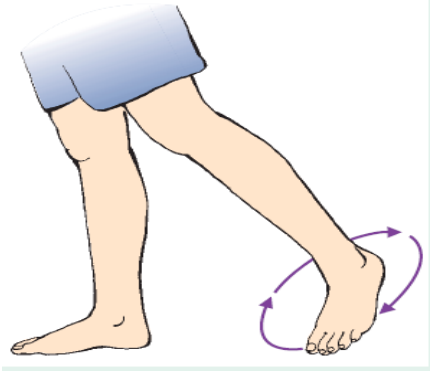
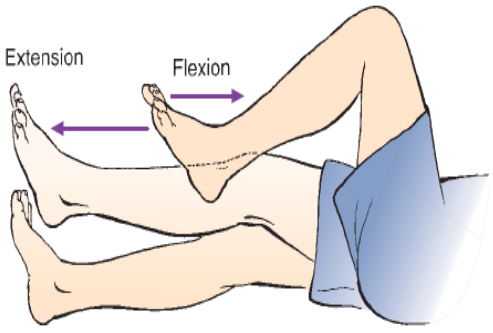
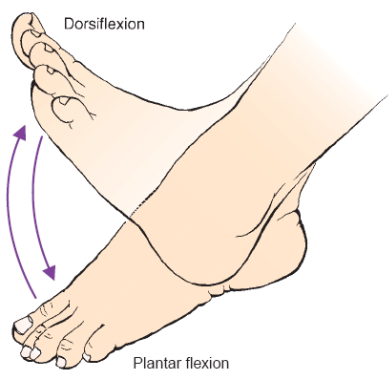


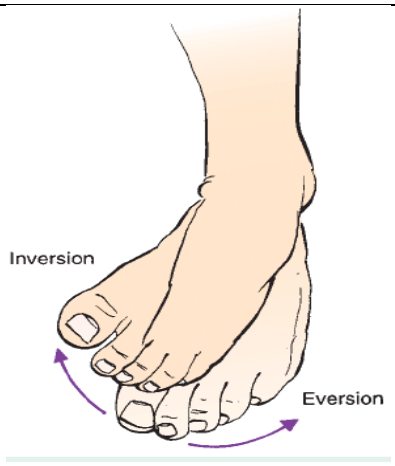
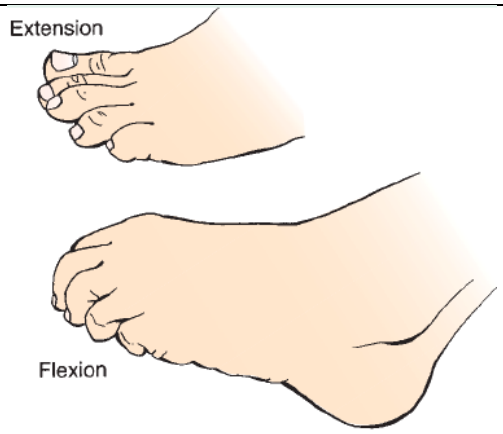
Neck flexion, extension, and hyperextension.

12. Place a hand on either side of head and move the neck from side to side.	Rotates the neck
13. Turn the head in a circular fashion.	Puts the head and neck through circumduction
 Neck rotation.	 Circumduction of the neck.
14. Support the elbow and wrist while moving the straightened arm above the head and behind the body.	Flexes, extends, then hyperextends the shoulder
15. Move the straightened arm away from body and then toward midline.	Abducts and adducts the shoulder
 Flexion, extension, & shoulder hyperextension.	 Shoulder Abduction and adduction.

16. Bend elbow and move arm so that the palm is upward and then downward.	Produces internal and external rotation of the shoulder
	Internal and external rotation of the shoulder.
17. Move the arm in a full circle.	Circumducts the shoulder
	Circumduction of the shoulder.
18. Place arm at client's side & bend the forearm toward the shoulder, and then straighten it again.	Flexes and extends the elbow
	Flexion, extension, and hyperextension of the elbow.
19. Bend the wrist backward and then forward.	Moves wrist from extension to hyperextension and then flexion
20. Twist the wrist to the right and then left.	Rotates the wrist joint

 Flexion, extension & hyperextension of the wrist.	 Rotation of the wrist.
21. Bend the thumb side of the hand toward the wrist and then away.	Provides abduction and then adduction of the wrist
22. Turn the palm upward and then downward.	Supinates and pronates the wrist
 Abduction and adduction of wrist.	 Supination and pronation of the wrist.
23. Open & close fingers as though making a fist.	Flexes and extends fingers
	Flexion and extension of the fingers.
24. Bend the thumb toward the center of the palm and then back to its original position.	Flexes and extends the thumb
25. Spread the fingers and thumb as widely as possible and then bring them back together again.	Abducts and adducts the fingers and thumb
	 Abduction & adduction of fingers &

Flexion and extension of the thumb.	thumb.
26. Bring the straightened leg forward of and backward from the body.	Flexes, extends, and hyperextends the hip
27. Move the straightened leg away from the body and back beyond the midline.	Abducts and then adducts the hip
 Flexion, extension, and hyperextension of the hip.	 Abduction and adduction of the hip.
28. Turn the leg away from the other leg and then toward it.	Rotates the hip externally and then internally
29. Turn the leg in a circle.	Circumducts the hip
 Bend the knee and then straighten it again.	 Flexes and extends the knee
30. Bend the foot toward the ankle and then away from the ankle.	Causes dorsiflexion and plantar flexion
	
31. Bend the sole of the foot toward the midline and then away from midline.	Inverts and everts the ankle

32. Bend and then straighten the toes.	Flexes and extends the toes
 Inversion and eversion of the ankle.	 Flexion and extension of the toes.
Evaluation	
▪ All joints are exercised to the extent possible ▪ Patient appears relaxed and correctly positioned ▪ Patient verbalizes comfort after treatment ▪ Effects of immobility were decreased. ▪ Facilitates joint range of motion	

Documentation

- Duration, including start and stop time
- Performance of exercise regimen
- Response of the client
- Client's tolerance of procedure
- Procedure performed, including direction and repetitions.
- Any limitations felt during motions.
- Report and discuss with prescriber any unusual findings, such as skin breakdown, increased pain after therapy.

Teaching Isometric Exercises

Principles

Patients can strengthen and increase muscle tone by contracting muscles against resistance (from other muscles or from a stationary object, such as a bed or a wall) without joint movement. These exercises require only a comfortable position standing, sitting, or lying down and proper body alignment. For each exercise, instruct the patient to hold each contraction for 5 to 10 seconds and to repeat it three to four times daily, below peak contraction level for the first week and at peak level thereafter. Isometric exercises assist the patient to decrease pain, increase strength, endurance, and circulation when adequate resistance (60%–80% of the maximum capacity) is applied.

Time Allowed: 5-7 minutes for each extremity

Practical skills outcomes:

At the end of this procedure student will be able to teach and perform isometric exercises effectively and safely.

Definitions & terminology:

- Isometric Exercises: active exercises that involve contracting and relaxing muscle groups with little or no movement.

Indications

- Improved cardiopulmonary function
- Increased muscle tone and strength
- Prevent muscle atrophy

Safety precautions

- Gentle handling may be necessary for a patient with a surgical site, including ROM, muscle contraction, healing restrictions, and contraindications to prevent injury.
- Determine need to educate caregivers about procedure.
- Elderly and Physically Challenged Patients: Determine and give consideration to patient's physical conditioning and cognitive status.

Quality control

- Check prescriber's orders to ensure that isometric exercises can be initiated.
- Site of application of resistance is usually distal to segment desired to be strengthened.
- Force is applied opposite the desired direction of movement.
- There is no change in joint position during application.

Neck rotators	The patient places heel of his hand above one ear. Then pushes his head toward hand as forcefully as possible, without moving the head, neck, or arm. He repeats the exercise on the other side.
Neck flexors	Places both palms on forehead. Without moving neck, pushes the head forward while resisting with the palms.
Neck extensors	Clasps fingers behind head, and then pushes the head against the clasped hands without moving neck.
Shoulder elevators	Holding right arm straight down at the side, grasps right wrist with left hand. Then tries to shrug right shoulder, but prevents it from moving by holding arm in place. Repeats this exercise, alternating arms.
Shoulder, chest, and scapular musculature	Places right fist in left palm and raises both arms to shoulder height. Pushes fist into the palm as forcefully as possible without moving either arm. Then, with arms in same position, clasps fingers and tries to pull hands apart. Repeats the pattern, beginning with left fist in right palm.
Elbow flexors and extensors	With right elbow bent 90 degrees and right palm facing upward, the patient places left fist against his right palm. He tries to bend the right elbow further while resisting with the left fist. Repeats the pattern, bending left elbow.
Abdomen	Assumes a sitting position and bends slightly forward, with his hands in front of middle of his thighs. He tries to bend forward further, resisting by pressing palms against thighs. Alternatively, in the supine position, clasps hands behind head. Then raises shoulders about (2.5 cm), holding this position for a few seconds.
Back extensors	In a sitting position, the patient bends forward and places his hands under his buttocks. He tries to stand up, resisting with both hands.
Hip abductors	While standing, the patient squeezes his inner thighs together as tightly as possible. Placing a pillow between the knees supplies resistance and increases the effectiveness of this exercise.
Hip extensors	Squeezes buttocks together as tightly as possible.
Knee extensors	The patient straightens his knee fully. Then vigorously tightens the muscle above knee so that it moves kneecap upward. He repeats this exercise, alternating legs.
Ankle flexors and extensors	Patient pulls toes upward, holding briefly. Then pushes them down as far as possible, again holding briefly.

Instruments & materials

No special equipment is needed, except gloves when contact with body fluids is possible.

Procedures (implementation)

Assessment

- Assess patient's baseline vital signs.
- Assess baseline muscle strength
- Patient's medical condition, especially if history of cardiac problems is present
- Assess grasp strength
- Observe patient's abilities to do daily activities (e.g., whether patient has adequate strength to bathe self, pull self up in bed, and move from bed to hair).
- Obtain patient's subjective statements related muscle strengths.

Relevant nursing diagnoses

- Impaired physical mobility related to trauma, surgery, or neuromuscular deficit
- Pain/discomfort related to inability to cope with body movements
- At risk for injury related to improper use of isometric exercises

Expected outcomes

- Patient will increase strength in extremities
- Increase circulation to applied area
- Patient will experience an increase in comfort and healing time

Implementation

Action	Rational
1. Review prescriber's orders.	Determine if patient can be moved and any limitation or contraindication
2. Explain procedure to patient and caregiver as indicated.	Enhances patient/caregiver understanding, participation, and relaxation.
3. Don clean gloves.	Reduces transmission of infectious organisms.
4. Evaluate patient's motion and strength.	Determines how much resistance & ROM for isometric contraction to be performed
5. Place patient in comfortable position.	Promotes relaxation.
6. Position yourself so that you can use good body mechanics.	Ensures provider safety.
7. Assess placement of IVs, and catheters.	Determine if devices will restrict techniques.
8. Expose body part to be exercised.	Ensures no restriction from clothing.
9. Drape patient appropriately.	Promotes patient privacy.
10. Place extremity in desired position.	To prevent possible injury.
11. Stabilize extremity by holding in place.	Helps prevent substitution from other muscle groups.
12. Demonstrate movement by taking extremity through passive ROM.	Enhances patient's understanding of motions.
13. At desired angle, instruct patient to hold against resistance.	Allows proper and safe movements.
Advance slowly to movements that are maximum and pain-free that the patient can tolerate.	Provides maximum effect of exercise without pain and/or injury.
14. Allow resistance to build from minimum to maximum.	Allows patient understanding of movements & optimal muscle contraction.
15. Hold contraction 5-10 seconds.	Allows physiological changes to occur.

16. Reassess patient's status related to strength, pain, and substitution.	Allows adjustments in resistance, joint angle, and patient position
17. Repeat 5-10 times and then consider different angles for strengthening entire muscle.	Allows treatment effects to entire muscle length.
18. Adjust resistance, ROM, patient position.	Ensures pain-free but maximum performance.
19. Monitor patient's response to treatment, including facial reactions, subjective reports, tissue response, vital signs, and ROM.	Provides information regarding accomplishment of treatment and adjustments in speed & ROM
20. Reposition patient's extremity and cover/drape appropriately.	Promotes patient comfort.
21. Raise side rails and replace any other protective devices in use.	Patient safety.
22. Document treatment.	As required by facility
23. Hold contraction 10 seconds.	Allows physiological changes to occur.
24. Reassess patient's status related to strength, pain, and substitution	Allows adjustments in resistance, joint angle, and patient position
25. Repeat 10 times and then consider different angles for strengthening entire muscle.	Allows treatment effects to entire muscle length
26. Adjust resistance, ROM, patient position.	Ensures pain-free but maximum performance.
27. Monitor patient's response to treatment, including facial reactions, subjective reports, tissue response, vital signs & ROM	Provides information regarding accomplishment of treatment and speed adjustments & ROM if necessary.
28. Reposition patient's extremity and cover/drape appropriately.	Promotes patient comfort.
29. Raise side rails and replace any other protective devices in use.	Patient safety.
30. Document treatment.	As required by facility.
Evaluation	
● Assess patient's ability to perform exercises ● Assess patient's compliance with exercise schedule ● Assess muscle tone ● Assess for complications of bedrest, including thrombophlebitis, atelectasis, renal calculi, pressure ulcers, joint deformity	

Documentation

- Patient's response to treatment, (subjective and body response).
- Procedure performed, including body part, direction, resistance, and repetitions.
- Any limitations/restrictions to treatment.
- Patient response/tolerance to treatment.