MRAD 223: Body Mechanics

MRT Program

Objectives:

- Identify patients requiring assistance
- Assess a patient's mobility
- Prevent patient falls in your department
- Prevent skin breakdown and creation of ulcers
- Restraints and immobilizers and radiolucent vs. radiopaque

Patient Assistance

Patients requiring assistance include:

- Stroke patients
- Patients with lower extremity fractures
- Patients with joint replacements
- Patients with spine trauma
- Post-surgery patients
- Paralyzed/immobile patients

Stroke Patients

- Typically have weakness of one side of the body.
- When standing, position yourself on the patient's weak side.
- When transferring, position the patient with the strong side adjacent to the bed or table.
- Instruct patient to lead with their strong leg.
- It's advisable to transport these patients by stretcher.

Lower Extremity Fractures

- Patients may be able to bear weight on an extremity that is immobilized in a cast or splint.
- Support the patient from the affected side during the transfer.
- Help the patient lift the leg when changing position. Support the limb both above and below the fracture (move unaffected joints to assist).

Lower Extremity Fractures (cont'd)

- Careful not to bump or twist the affected leg during the transfer.
- Do not remove splints or other supportive devices (some are radiolucent).
- Use these similar precautions for a patient with an undiagnosed leg injury.

Joint Replacements

- These patients are usually transported on a stretcher.
- Special care is required, especially when transferring during the recovery period.
- Restrictions vary in accordance with the surgical approach used (i.e., anterior vs. posterior).
- Motion must be restricted to avoid stress on muscles that have been surgically disrupted.
- Check chart for patient limitations. Some surgeons have standing orders

Hip Joint Replacements

Anterior Approach hip replacement:

- Do not permit patient to adduct, abduct or rotate affected leg.
- Avoid hyperextension, especially when walking.
- Patients with an anterior approach are permitted to sit upright in a chair at a 90-degree angle.
- X-ray exams are not to be a substitute for rehab

Hip Joint Replacements (cont'd)

Posterior Approach hip replacement:

- This approach is the most common.
- Patient is able to tolerate abduction (lateral movement away from median plane of body)
- Avoid adduction and internal rotation.
- Do not allow patient to flex at the hip beyond 90 degrees.
- If patient needs to sit up (e.g., trouble breathing), take care that they do not bend forward as most dislocations occur when the patient bends forward past 90 degrees.

Knee Joint Replacements

- Similar considerations to hip replacement.
- Weight bearing is usually tolerated, but a walker should be provided if patient will be taking more than 1–2 steps.
- During transfer, move patient toward the strong side and place support under the calf and knee of affected leg to provide comfort and safety.

Trauma and spinal injuries

- Check the hospital/clinics "Trauma and Spinal precautions" protocol and procedures. Example-
- Most spinal injuries occur in cervical or lumbar regions.

- Patient must be transferred by stretcher.

Spinal Surgery

- During initial phase of recovery, patient should be accompanied by the primary caregiver to direct technologists in safe positioning of the patient.
- When changing positions from recumbent to upright, the patient should sit in the lateral recumbent position (opposite from upright to recumbent).
- Provide support and assistance to extend legs and place bolster or pillow under knees for support.

Paralysis

- Inpatients who are paralyzed or unable to stand must be transported by stretcher(request when pt. sent from unit)
- Outpatients may arrive at the hospital in a custom wheelchair. Ask pt. for input.
- Some extremity exams and chest x-ray may be performed in the wheelchair.
- Other procedures will require the patient be transferred onto the radiographic table. Seek additional help.

Assessing Patient Mobility Reference Torres 9th ed.

- Deviations from correct body alignment
  - *May result from poor posture, trauma, muscle damage, dysfunction of the nervous system, malnutrition, fatigue or emotional disturbance.*

- Immobility or limitations in range of joint motion
  - *Stiffness, instability, swelling, inflammation, pain, limitation of movement or atrophy of muscle mass.*

Assessing Patient Mobility (cont'd)

3.The ability to walk

- *Gait includes rhythm, speed and any characteristic of walking that may result in a problem with balance, posture or independence of movement.*

4.Respiratory, cardiovascular, metabolic and musculoskeletal problems

- E.g., *diabetics with impaired circulation or rheumatoid arthritis patients.*

Assessing Patient Mobility (cont'd)

Other assessment considerations include:

- Patient's general condition- how healthy are they?
- Range of motion and weight-bearing ability.
- Patient's strength and endurance.
- Patient's ability to maintain balance.
- Patient's ability to understand what is expected during transfer.
- Patient's acceptance to move. Fear of pain
- Patient's medication history. Influences balance etc.

Safe Patient Transfer-Basic Steps

- Check with nursing staff and obtain chart.
- Check patient identification.
- Obtain equipment and check it for safety and function.
- Check the area for equipment attachments (e.g., urinary catheters, oxygen tubing, etc.).

Safe Patient Transfer (cont'd)

5. Enlist the patient's help and cooperation. Tell the patient what you are doing and why (this will help earn their trust). Keep explanation simple.

6. Obtain additional help when necessary. Be certain that your assistants understand their roles in the transfer plan.

7. Use short, simple instructions. Clarification

Safe Patient Transfer (cont'd)

Summary:

- Before beginning the move, the amount of assistance needed to safely complete the move and procedure must be planned.

Planning ensures:

- The patient is transferred safely.
- The healthcare member is not injured during the transfer.

Prevention of Falls

- No patient should be allowed to get out of a wheelchair or off of a stretcher or radiographic table without assistance.
- *Patients most prone to falls are*:
  - Frail and elderly
  - Weak
  - Patients with neurological deficits
  - Patients with a head trauma
  - Sedated or confused patients
- If a patient is falling, the best place to stand is **behind** them.

Prevention of Falls (cont'd)

Rules to prevent falls:

- Learn the condition of your patient and determine whether they are safely able to enter, remain in and leave the DI department without assistance.
- Keep floor clear of objects that may obstruct pathways. Trip trying to go around W/C
- Store equipment in proper locations or holding areas.
- Side rails must always be up when patients are on a stretcher.
- Wheelchairs must be locked if a patient is in it.

Fall-Prevention Equipment

- Safety straps (restraints or immobilizers)
- Side rails
- Compression bands
- Brakes on equipment

Skin Breakdown – Ulcers

Mechanical factors that contribute to skin breakdown and the formation of ulcers include:

- **Immobility**
  - Extended time in one position can restrict blood flow to area and cause tissue necrosis.
- **Pressure**
  - Inadequate protection of skin or moving too rapidly can create a shearing force (i.e., tissue tearing).

Skin Breakdown – Ulcers (cont'd)

Mechanical factors that contribute to skin breakdown and the formation of ulcers include:

- **Friction**
  - Caused by movement back and forth on a rough/uneven surface (e.g., bed sheet).
- **Dampness**
  - Fecal material or urine on a gown or sheet acts like an irritant, damaging the skin.

Ulcers

Skin goes through two phases of breakdown:

- Blanching and a feeling of coldness, called **ischemia**.
- Heat and redness in the area as blood returns to the area, called **reactive hyperemia**.

Ulcers (cont'd)

Patients most at risk for developing ulcers:

- Elderly
- Malnourished
- Chronically ill

Preventing Decubitus Ulcers

- Decubitus ulcers are those caused by pressure/immobility.
- Some radiographic exams or procedures can take 30–60 minutes.
- Change patient if damp.
- Keep pressure off hips, knees and heels.
- Reposition patient every ~10 min if on hard surface (e.g., x-ray table).
- Remember: skin breakdown can occur in 1–2 hours.

Preventing Decubitus Ulcers (cont'd)

Areas susceptible to ulcer development:

- Scapulae
- Sacrum
- Trochanters
- Knees
- Heels of feet

Restraints vs. Immobilizers

- **Immobilization** refers to the use of various devices to keep a patient from moving during an imaging procedure (e.g., tape, lead shields, sandbags, etc.).

- **Restraints** are used to:
  - Ensure patient safety.
  - Prevent undesirable motion.
  - Prevent disengaging therapeutic devices.

- *Restraints* **require** a physician's order.
- *Immobilization devices* **do not** require a physician's order.

Seven Rules of Immobilizers and Restraints

- Patient must be allowed as much mobility as safely possible.
- Immobilizers/restraints must be padded to prevent injury to skin beneath device.
- Normal anatomic position must be maintained.
- Must use knots that will not become tighter with movement (e.g., half knot).

5. Circulation and respiration must not be impaired by immobilizer/restraint. Sometimes circulation may be compromised briefly, but this is in rare cases.
6. Immobilizer/restraint must be easy to remove quickly.
7. If leg/ankle immobilizers/restraints are used, then wrist immobilizers/restraints must be applied as well (i.e., four-point restraint).

Restraints and Immobilizers

- Most effective method to avoid the need to restrain an adult patient is the use of **therapeutic communication**.

- Restraints should be used **only** after less restrictive measures have been attempted and have proven ineffective in protecting the patient.

Restraints and Immobilizers (cont'd)

- Must always be applied to the frame of the stretcher or bed, not to any moveable parts such as the side rails of stretchers.

- If you are alone or have only one other tech with you, do not try to apply immobilizers to an extremely aggressive or combative patient. It's unsafe for the tech and patient.

Equipment Used for Immobilization

- Sponges
- Tape
- Sand bags
- Compression bands
- Velcro straps
- Sheets
- Lead shields
- Specialty devices such as a Pigg-O-Stat

Radiolucent or radiopaque?

- Sponges-radiolucent
- Tape-radiolucent
- Sand bags-radiopaque
- Compression bands-radiolucent
- Velcro straps-radiolucent
- Sheets-radiolucent(unless stacked/numerous)
- Lead shields-radiopaque
- Specialty devices such as a Pigg-O-Stat-radiolucent.

Note-pillows can cause artifacts depending on the material used. Pillow case covers with zippers cause artifact as well(radiopaque)

Miscellaneous points

- A stretcher(gurney) is different from a patient's bed. The stretcher is primarily used for transporting patients because of it's size, mattress firmness and mobility (exception is ICU patients)
- Patients who are accompanied to the D.I dept.by their nurse or a RT(respiratory therapist) typically have their x-rays performed ahead of other patients. Can you guess why that would be? Think resources or # of staff members.