Body mechanism + moving, turning & positioning

Presented by: Ms. Sohad Noorsaeed, RN, MSN
Outlines:

• Define body mechanics.

• List the purposes, principles, and techniques of body mechanics.

• Practice putting the client in different positions appropriately.

• Appropriate use of supportive devices.

• Moving and Transferring patients.
BODY MECHANICS

- BODY MECHANICS
  Is the efficient, coordinated, and safe use of the body to move objects and carry out the activities of daily living.
Rationale for the Use of This Skill

• A nurse engaged in clinical practice daily performs a variety of physical tasks, including reaching, stooping, lifting, carrying, pushing and pulling.

• With practice, using the principle of body mechanics, the nurse will move smoothly and surely, minimizing personal strain, conserving energy, and enhancing the safety, comfort, and confidence of the patients.

• Practiced incorrectly, any of these has the potential to cause strain, fatigue, or injury to the nurse or patient.
Major purposes for proper body mechanics

- To facilitate the safe and efficient use of appropriate muscle groups
- To maintain body balance
- To reduce the energy required
- To reduce fatigue
- To decrease the risk of injury
Principles of Body Mechanics

• 1. Balance is maintained and muscle strain is avoided as long as the line of gravity passes through the base of support.

❖ Start body movement with proper alignment
❖ Stand as close as possible to the object to be moved
❖ Avoid stretching, reaching and twisting
Natural Body Alignment

Head straight
Shoulders roll back
Back arches
Pelvis aligns
• 2. The wider the base of support and the lower the center of gravity, the greater the stability.
• 3. Balance is maintained with minimal effort when the base of support is enlarged in the direction in which the movement will occur.

• When **pushing** an object, enlarge the base of support by **moving the front foot forward**

• When **pulling** an object, enlarge the base of support by either **moving the rear leg back** if facing the object or **moving the front foot forward** facing away from the object
• 4. Objects that are close to the center of gravity are moved with least effort.
• 5. The greater the preparatory, or contraction of muscles before moving an object, the less the energy required to move it and the less the likelihood of musculoskeletal strain injury.

❖ Before moving objects, contract your gluteal, abdominal, leg and hip muscles to prepare them for action.
6. The synchronized use of as many large muscle groups as possible during activity increases overall strength and prevents muscle fatigue and injury.

- To move objects below your center of gravity, begin with the hip and knees flexed.
- Use gluteal and leg muscles rather than the sacrospinal muscles of the back to exert an upward thrust when lifting weight.
- Face the direction of the movement to prevent twisting of the spine.
Caution!!!!!

Never bend at the waist

The wrong way!  The right way!
• 7. The closer the line of gravity to the center of the base of support the greater its stability

❖ When moving or carrying objects, hold them as close as possible to the center of gravity
❖ Pull an object toward self whenever possible rather than pushing away
• 8. The greater the friction against a surface beneath an object, the greater force required to move an object. Provide a firm smooth, dry bed foundation before moving the client in bed.

• 9. Pulling creates less friction than pushing.
• 10. The heavier an object, the greater the force needed to move an object.
  ❖ Encourage the client to assist as much as possible by pushing or pulling themselves by the use of arms as levers to increase lifting power.

• 11. Use own body weight to counteract the weight of the object.
  ❖ Obtain the assistance of other persons or use mechanical devices to move objects that are too heavy.

Caution !!!!
  ➢ “No Solo Lift” or
  ➢ “No Manual Lift”
12. Moving an object along a level surface requires less energy than moving object up an inclined surface or lifting it against the force of gravity.

- Pull, push, roll or turn objects instead of lifting them
- Lower the head of the client’s bed before moving the client up in bed.

13. Continuous muscle exertion can result in muscle strain and injury. Alternate rest periods with periods of muscle use to help prevent fatigue.
TECHNIQUES OF BODY MECHANICS

1- Lifting

• Use the stronger leg muscles for lifting.
• Bend at the knees and hips; keep your back straight.
• Lift straight upward, in one smooth motion.
2- Pulling and pushing

• When pushing, enlarge the base of support by moving the front foot forward. When pulling an object, enlarge the base of support by moving the rear back if the person is facing the object or moving the front foot forward if the person is facing away from the object.
3- Pivoting

• Place one foot slightly ahead of the other.
• Turn both feet at the same time, pivoting on the heel of one foot and the toe of the other.
• Keeping the body aligned, turn about 90 degrees in the desired direction.
Positioning a client

- Positioning a client in good body alignment and changing the position regularly and systematically are essential aspects of nursing practice.

**Importance of position change:**

- Help in maintain muscle tone
- Help to prevent muscle discomfort, undue pressure resulting in pressure ulcer, damage to superficial nerves and blood vessels, and contractures.
Support Devices

Pillows

Mattress

Chair bed

Overhead trapeze
Support Devices

- Trochanter roll
- Sliding board
- Bed board
- Mechanical lift
Support Devices

Foot board

Foot drop boot

Hand roll
Types of Positions

- Fowler’s Position.
- Orthopneic Position.
- Supine Position.
- Prone Position.
- Lateral Position.
- Sims’ Position
• Always maintain proper body alignment
Fowler’s Position

**Fowler’s position or semi-sitting position**
Is a bed position in which the head and trunk are raised **45** to **90** degrees

**Low Fowler’s or Semi-Fowler’s position**
The head and trunk are raised **15** to **45** Degrees.

**High Fowler’s position**
The head and trunk are raised **90** Degrees.
Fowler’s position is the position for choice for:

- People who have difficulty breathing and heart problems because when the client is in this position, gravity pulls the diaphragm downward, allowing greater chest expansion and lung ventilation.
<table>
<thead>
<tr>
<th>UNSUPPORTED POSITION</th>
<th>PROBLEM TO BE PREVENTED</th>
<th>CORRECTIVE MEASURE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed-sitting position with upper part of body elevated 30–90° commencing at hips</td>
<td>Posterior flexion of lumbar curvature</td>
<td>Pillow at lower back (lumbar region) to support lumbar region</td>
</tr>
<tr>
<td>Head rests on bed surface</td>
<td>Hyperextension of neck</td>
<td>Pillows to support head, neck, and upper back</td>
</tr>
<tr>
<td>Arms fall at sides</td>
<td>Shoulder muscle strain, possible dislocation of shoulders, edema of hands and arms with flaccid paralysis, flexion contracture of the wrist</td>
<td>Pillow under forearms to eliminate pull on shoulder and assist venous blood flow from hands and lower arms</td>
</tr>
<tr>
<td>Legs lie flat and straight on lower bed surface</td>
<td>Hyperextension of knees</td>
<td>Small pillow under thighs to flex knees</td>
</tr>
<tr>
<td>Heels rest on bed surface</td>
<td>Pressure on heels</td>
<td>Pillow under lower legs</td>
</tr>
<tr>
<td>Feet are in plantar flexion</td>
<td>Plantar flexion of feet (foot drop)</td>
<td>Footboard to provide support for dorsal flexion</td>
</tr>
</tbody>
</table>
• Body pressure areas

- Heels (calcaneus)
- Vertebrae (spinal processes)
- Pelvis (ischial tuberosity)
- Sacrum
- Fowler’s position supported
Orthopneic Position

- The client sits either in bed or on the side of the bed with an over bed table across the lab.

- Helpful to clients who have Respiratory problems.
Dorsal Recumbent Position (Back Lying) supine position

• In this position the client head and shoulder are slightly elevated on small pillow.

• The terms *dorsal recumbent position* and *supine position* are used interchangeably. But in some agency supine position mean that the head and shoulders are not elevated.
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<tbody>
<tr>
<td>Head is flat on bed surface</td>
<td>Hyperextension of neck in thick-chested person</td>
<td>Pillow of suitable thickness under head and shoulders if necessary for alignment</td>
</tr>
<tr>
<td>Lumbar curvature of spine is apparent</td>
<td>Posterior flexion of lumbar curvature</td>
<td>Roll or small pillow under lumbar curvature</td>
</tr>
<tr>
<td>Legs may be externally rotated</td>
<td>External rotation of legs</td>
<td>Roll or sandbag placed laterally to trochanter of femur (optional)</td>
</tr>
<tr>
<td>Legs are extended</td>
<td>Hyperextension of knees</td>
<td>Small pillow under thigh to flex knee slightly</td>
</tr>
<tr>
<td>Feet assume plantar flexion position</td>
<td>Plantar flexion (foot drop)</td>
<td>Footboard or rolled pillow to support feet in dorsal flexion</td>
</tr>
<tr>
<td>Heels on bed surface</td>
<td>Pressure on heels</td>
<td>Pillow under lower legs</td>
</tr>
</tbody>
</table>
• This position is used to provide comfort and to facilitate healing following certain surgeries or anesthetics (e.g., spinal).
Prone Position

• Client lies on the abdomen with the head to one side.
• The hips are not flexed, and with one or both arms flexed over their head.
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<tbody>
<tr>
<td>Head is turned to side and neck is slightly flexed</td>
<td>Flexion or hyperextension of neck</td>
<td>Small pillow under head unless contraindicated because of promotion of mucous drainage from mouth</td>
</tr>
<tr>
<td>Body lies flat on abdomen accentuating lumbar curvature</td>
<td>Hyperextension of lumbar curvature; difficulty breathing; pressure on breasts (women); pressure on genitals (men); Plantar flexion (foot drop)</td>
<td>Small pillow or roll under abdomen just below diaphragm</td>
</tr>
<tr>
<td>Toes rest on bed surface; feet are in plantar flexion</td>
<td></td>
<td>Allow feet to fall naturally over end of mattress, or support lower legs on a pillow so that toes do not touch the bed</td>
</tr>
</tbody>
</table>
Advantages and disadvantages of prone position

**Advantages:**
- Allows full extension of the hip and knee joints.
- Help to prevent flexion contractures of the hips and knees.
- Promotes drainage from the mouth, especially for unconscious clients, or client recovery from surgery of the mouth or throat.

**Disadvantages:**
- Pull of gravity on the trunk produced a marked lordosis in most people.
- The neck is rotated laterally to a significant degree (not recommended for client with cervical or lumbar problems).
- Causes plantar flexion.
- For clients with cardiac or respiratory problems find it suffocating because chest expansion is inhibited.

*Used only when the client’s back is correctly aligned, for short periods and no evidence of spinal abnormalities.*
Lateral Position

- Patient lies on one side of the body, with flexing the hip and knee and placing the leg in front.
- The leg flexion reduces lordosis and promotes good back alignment.
- Comfortable position for resting and sleeping.
- Help to remove the pressure on sacrum and heels.
<table>
<thead>
<tr>
<th><strong>TABLE 12-7 Lateral Position</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNSUPPORTED POSITION</strong></td>
</tr>
<tr>
<td>Body is turned to side, both arms in front of body, weight resting primarily on lateral aspects of scapula and ilium</td>
</tr>
<tr>
<td>Upper arm and shoulder are rotated internally and adducted</td>
</tr>
<tr>
<td>Upper thigh and leg are rotated internally and adducted</td>
</tr>
<tr>
<td><strong>PROBLEM TO BE PREVENTED</strong></td>
</tr>
<tr>
<td>Lateral flexion and fatigue of sternocleidomastoid muscles</td>
</tr>
<tr>
<td>Internal rotation and adduction of shoulder and subsequent limited function; impaired chest expansion</td>
</tr>
<tr>
<td>Internal rotation and adduction of femur; twisting of the spine</td>
</tr>
<tr>
<td><strong>CORRECTIVE MEASURE</strong></td>
</tr>
<tr>
<td>Pillow under head and neck to provide good alignment</td>
</tr>
<tr>
<td>Pillow under upper arm to place it in good alignment; lower arm should be flexed comfortably</td>
</tr>
<tr>
<td>Pillow under leg and thigh to place them in good alignment; shoulders and hips should be aligned</td>
</tr>
</tbody>
</table>
• Body pressures areas
Sims’ Position

• In Sims’ (semi-prone) position. The client positioned halfway between the lateral and prone position.
• Used for unconscious client, to facilitate drainage and prevent aspiration of fluids.
• Used for paralyzed clients, it reduced the pressure over scrotum and hip
• Used for clients receiving enemas, and clients undergoing examinations or treatment of the perineal area.
• Recommended for pregnant women.
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<tbody>
<tr>
<td>Head rests on bed surface; weight is borne by lateral aspects of cranial and facial bones</td>
<td>Lateral flexion of neck</td>
<td>Pillow supports head, maintaining it in good alignment unless drainage from the mouth is required</td>
</tr>
<tr>
<td>Upper shoulder and arm are internally rotated</td>
<td>Internal rotation of shoulder and arm; pressure on chest, restricting expansion during breathing</td>
<td>Pillow under upper arm to prevent internal rotation</td>
</tr>
<tr>
<td>Upper leg and thigh are adducted and internally rotated</td>
<td>Internal rotation and adduction of hip and leg</td>
<td>Pillow under upper leg to support it in alignment</td>
</tr>
<tr>
<td>Feet assume plantar flexion</td>
<td>Foot drop</td>
<td>Sandbags to support feet in dorsal flexion</td>
</tr>
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</table>
MOVING A CLIENT UP IN BED

EQUIPMENT
- Assistive devices such as overhead trapeze, pull and/or turn sheet, and transfer or sliding bar

PERFORMANCE
1. Determine:
   - Assistive devices that will be required.
   - Barriers to movement such as an intravenous drip or a heavy cast on one leg.
   - Medications the client is receiving, because certain medications may influence movement or alertness of the client.
   - Assistance required from other health care personnel.
2. Assess the client’s weight, physical abilities (e.g., muscle strength, presence of paralysis), ability to understand instructions, degree of comfort or discomfort when moving (if needed, administer analgesics or perform other pain relief measures; see Chapter 18).
3. Introduce self and verify the client’s identity using institution’s protocol. Explain to the client what you are going to do, why it is necessary, and how he or she can cooperate. Listen to any suggestions made by the client or support people. Discuss how the results will be used in planning further care or treatments.
4. Wash hands and observe appropriate infection control procedures.
5. Provide for client privacy.
6. Adjust the bed and the client’s position.
   - Adjust the head of the bed to a flat position or as low as the client can tolerate. Moving the client upward against gravity requires more force and can cause back strain.
- Raise the bed to the height of your center of gravity.
- Lock the wheels on the bed and raise the rail on the side of the bed opposite you.
- Remove all pillows, then place one against the head of the bed. **Rationale** This pillow protects the client’s head from possible injury against the top of the bed during the upward move.

7. Ask for the client’s help in lessening your workload.
- Ask the client to flex the hips and knees and position the feet so that they can be used effectively for pushing. **Rationale** Flexing the hips and knees keeps the entire lower leg off the bed surface preventing friction during movement, and ensures use of the large muscle groups in the client’s legs when pushing, thus increasing the force of movement.
- Ask the client to
  a. Grasp the head of the bed with both hands and pull during the move.
  or
  b. Raise the upper part of the body on the elbows and push with the hands and forearms during the move.
  or
  c. Grasp the overhead trapeze with both hands and lift and pull during the move. **Rationale** Client assistance provides additional power to overcome inertia and friction during the move. These actions also keep the client’s arms partially off the bed surface, reducing friction during movement, and make use of the large muscle groups of the client’s arms to increase the force during movement.

8. Position yourself appropriately, and move the client.
- Face the direction of the movement, and then assume a broad stance with the foot nearest the bed behind the forward foot and weight on the forward foot. Lean your trunk forward from the hips. Flex hips, knees, and ankles.
- Place your near arm under the client’s thighs. **Rationale** This supports the heaviest part of the body (the buttocks). Push down on the mattress with the far arm. **Rationale** The far arm acts as a lever during the move.
- Tighten your gluteal, abdominal, leg, and arm muscles and rock from the back leg to the front leg and back again. Then, shift your weight to the front leg as the client pushes with the heels and pulls with the arms so that the client moves toward the head of the bed.

- Elevate the head of the bed and provide appropriate support devices for the client’s new position.
- See the sections on positioning clients earlier in this chapter.

**Variation: A Client Who Has Limited Strength of the Upper Extremities**
- Assist the client to flex the hips and knees as in step 7 previously. Place the client’s arms across the chest. **Rationale** This keeps them off the bed surface and minimizes friction during movement. Ask the client to flex the neck during the move and keep the head off the bed surface.
- Position yourself as in step 8 and place one arm under the client’s back and shoulders and the other arm under the client’s thighs. **Rationale** This placement of the arms distributes the
client's weight and supports the heaviest part of the body (the buttocks). Shift your weight as in step 8.

**Variation: Two Nurses Using a Hand–Forearm Interlock**

Two people are required to move clients who are unable to assist because of their condition or weight. Using the technique described in step 8, with the second staff member on the opposite side of the bed, both of you interlock your forearms under the client’s thighs and shoulders and lift the client up in bed.

**Variation: Two Nurses Using a Turn Sheet**

Two nurses can use a turn sheet to move a client up in bed. **Rationale** A turn sheet distributes the client’s weight more evenly, decreases friction, and exerts a more even force on the client during the move. In addition, it prevents injury of the client’s skin, because the friction created between two sheets when one is moved is less than that created by the client’s body moving over the sheet.

- Place a drawsheet or a full sheet folded in half under the client, extending from the shoulders to the thighs. Each person rolls up or fanfolds the turn sheet close to the client’s body on either side.
- Both individuals grasp the sheet close to the shoulders and buttocks of the client. **Rationale** This draws the weight closer to the nurse’s center of gravity and increases the nurse’s balance and stability, permitting a smoother movement. Follow the method of moving clients with limited upper extremity strength as described earlier.

10. Document all relevant information. Record time of positioning and the position moved to, any signs of pressure areas, use of devices, and the client’s response to moving and his or her ability to assist.
Moving client in lateral or prone position in bed

A

B

Moving a client to a lateral position.
Logrolling client:

1. Correct arm placement for moving a client to the side of the bed: two nurses.

2. Correct arm placement for moving a client to the side of the bed: three nurses.

3. Correct hand placement for logrolling a client.
4 Using a turn sheet, the nurses pull the sheet with the client on it to the edge of the bed.

5 The nurse on the right uses the far edge of the sheet to roll the client toward her; the nurse on the left remains behind the client and assists with turning.
Dangling (sit at the bedside):

A

B

Moving to a sitting position independently.
Transferring between bed and chair

The wheelchair is placed parallel to the bed as close to the bed as possible. Note that placement of the nurse’s feet mirrors that of the client’s feet.
SAFETY MEASURES WITH WHEELEDCHAIRS

- ALWAYS LOCK THE BRAKES WHEN TRANSFERRING
- CLEAN THE WHEELCHAIR ON A REGULAR BASIS
- MOVE THE FOOTRESTS OUT OF THE WAY WHEN TRANSFERRING
APPLY THE BELT AROUND THE PERSON’S WAIST, OVER THE CLOTHING.

TIGHTEN THE BELT SO IT IS SNUGL. IT SHOULD NOT CAUSE DISCOMFORT OR IMPAIR BREATHING. YOU SHOULD BE ABLE TO SLIDE YOUR OPEN HAND UNDER THE BELT.

PLACE THE BUCKLE SLIGHTLY OFF CENTER IN THE FRONT.

DO NOT USE WITH PATIENTS WITH FRACTURED RIBS, ABDOMINAL SURGERY, OR HAVING BREATHING DIFFICULTIES
ASSISTING THE PATIENT TO TRANSFER
A. Brace the patient’s knees and feet with your knees and feet.

B. Bring the patient to a standing position.
TRANSFER FROM BED TO STRETCHER

TAKES 4 OR MORE STAFF

USE A LIFT SHEET OR SLED TO PULL PATIENT OVER ONTO CART