Mechanics, Falls, Transfer, Positioning, & Immobilization

Part 4

1

Body Mechanics

2

Increasing Job Safety….

Biomechanics

- Examines the action of forces on bodies at rest or in motion
- Gives insights into mechanisms of injury

Understanding of the basics of biomechanics:

- Help prevent back injury
- Promote safe and effective:
  - patient transfer
  - position

3

1. Base of Support

Foundation which the body rest

- Standing – the feet and the space between the feet

Feet far apart = larger base of support = better support

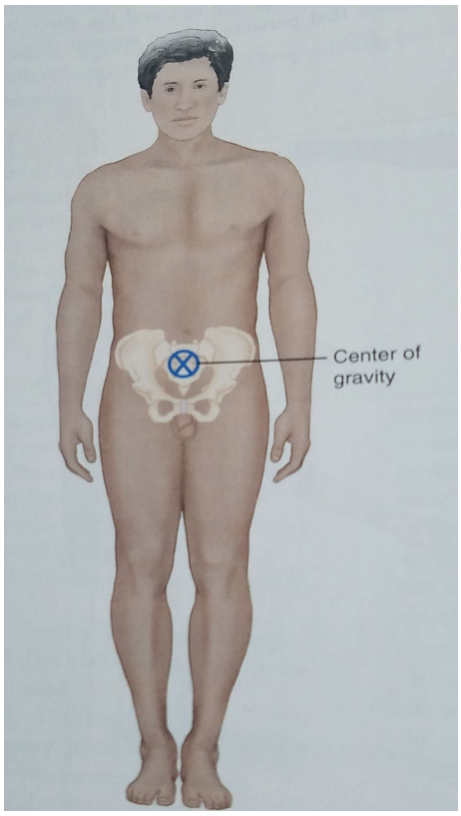
When transferring a patient, you need a stable base of support

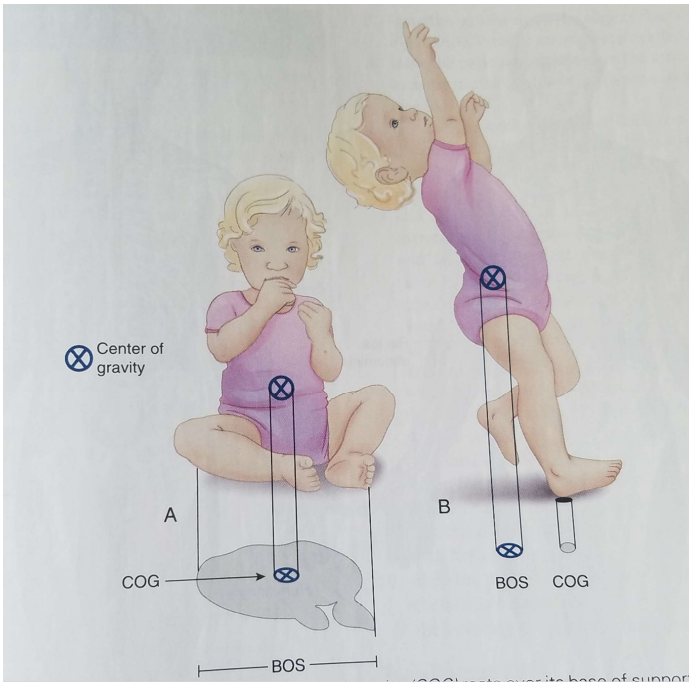
4

2. Center of Gravity

- Hypothetical point at which all the mass appears to be concentrated
- Anatomic position – Sacral level two
- Stability is achieved when the body's center of gravity is over its base of support
- Instability occurs when the center of gravity is beyond the boundaries of the base

5





6

3. Mobility and Stability Muscles

- Mobility – found in limbs = use for lifting
  - Bicep, hamstring
- Stability – found in torso = use for support
  - Provide postural support
  - Rectus abdominis – support abdomen

- Lifting done by bending and straightening knees and the back should be kept straight or slight lumbar lordosis

7

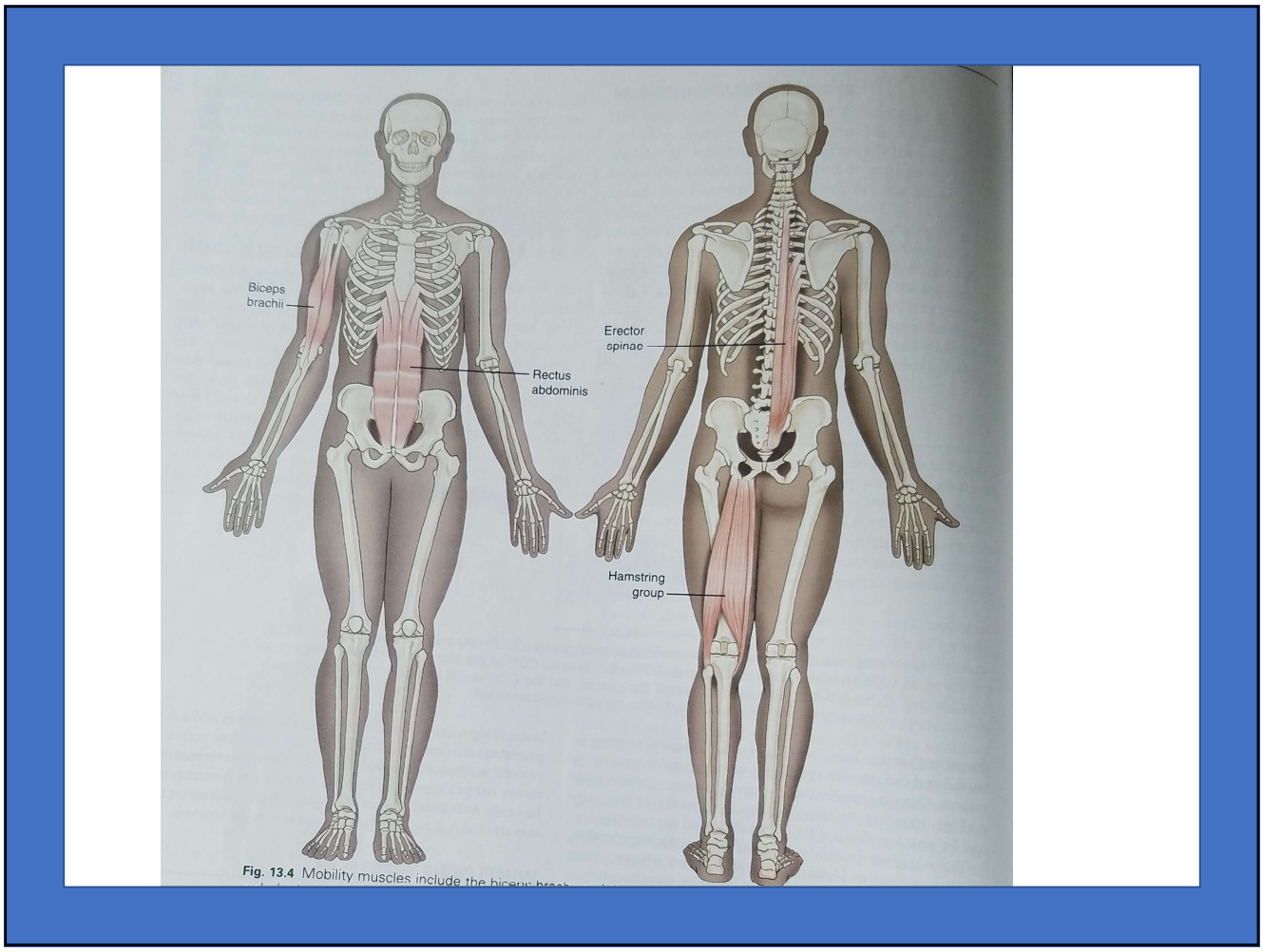
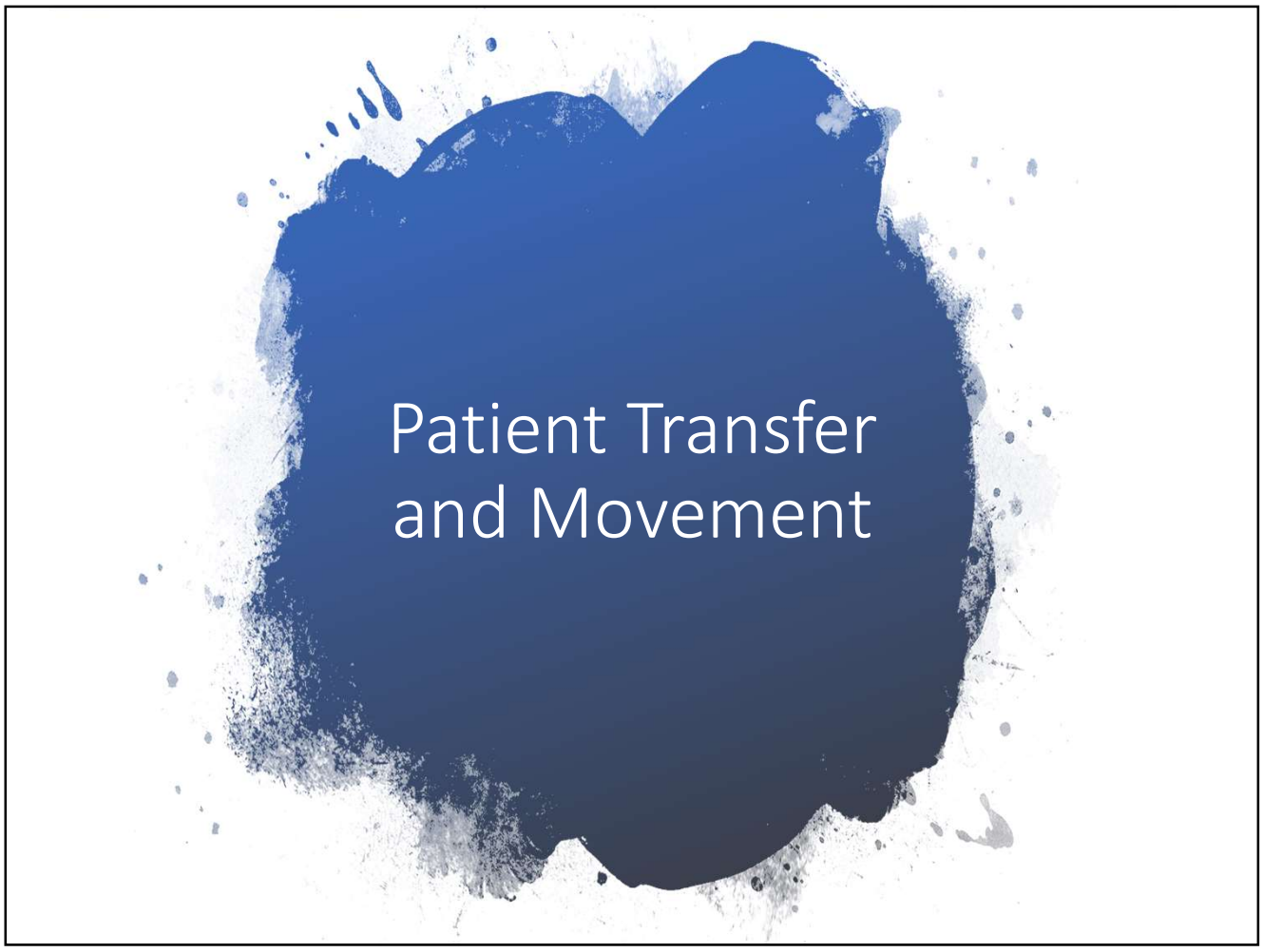


Fig. 13.4 Mobility muscles include the biceps brachii, rectus abdominis, erector spinae, and hamstring group.

8



9

Assess the patient's mobility

- Always ask the patient if they can independently do the transfer
- Let patients do as much as possible
- Check the chart
  - Weight bearing restrictions
- Be protective with certain diagnoses
  - Pelvic girdle fracture, dementia
- Inform the patient of what you are doing and list your steps out

10

Rules for safe patient transfer…

- Stand with feet apart
- Patient's center of gravity should be held close to transferee's center of gravity
- Use transfer belt if available
- Keep back stationary and let legs do the lifting
- NO TWISTING, pivot

11

Beware…. Orthostatic hypotension

- Dizziness, fainting, blurred vision and slurred speech
- Patient should stand slowly
- Talk throughout transfer

12

- Yellow wrist band
- Spinning top symbol
- Documentation of assistance needs on the Hall Pass

Reading Hospital recognizes the need to take special measures for patients who are a fall risk

13

Wheelchair Transfers

1. Standby assist
2. Assisted standing pivot
3. Two-person lift
4. Hydraulic lift

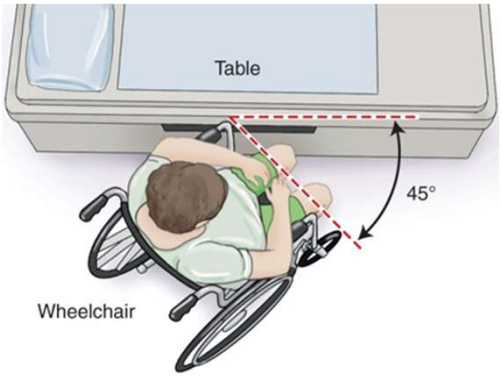
14

Things to remember:

- Before allowing a patient to stand, make sure his/her feet are properly covered for support
  - Shoes
  - Nonskid slippers
  - Slipper socks
- Always transfer to the patient's strong side
- Brakes are locked
- Footrests removed or folded

15

1. Standby Assist

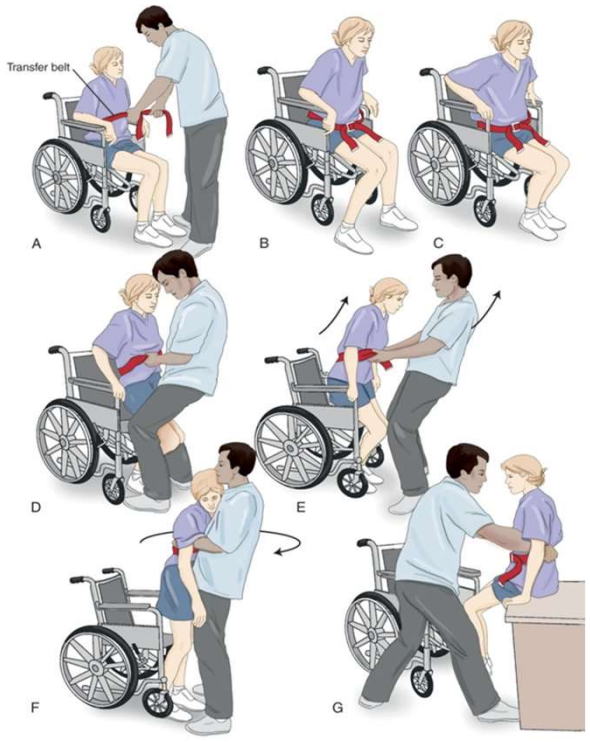


- Used for patients who have the ability to transfer from a wheelchair to a table on their own
- Provide movement instructions to the patient continually during transfer
  - Suggestions of instructions on pg. 145

16

2. Assisted Standing Pivot Transfer

- For patients who cannot transfer independently but can bear weight on their legs, a standing pivot technique is used.
- Wheelchair at 45 degree angle to the table



http://www.youtube.com/watch?v=NcffCGFGRjM

17

3.Two-Person Lift

- Use on patients who are lightweight and cannot bear weight on their lower extremities.
- Stronger person lifts the patient's torso, other person lifts the feet
  - Torso lifter is the in charge lifter
- Verbally plan out procedure

18

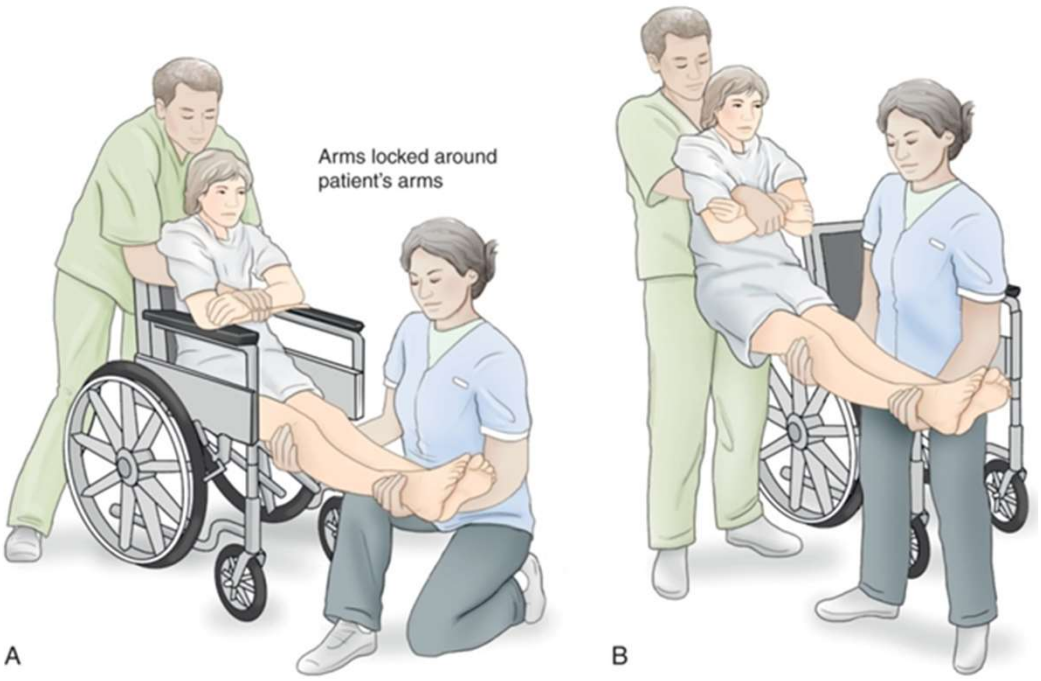
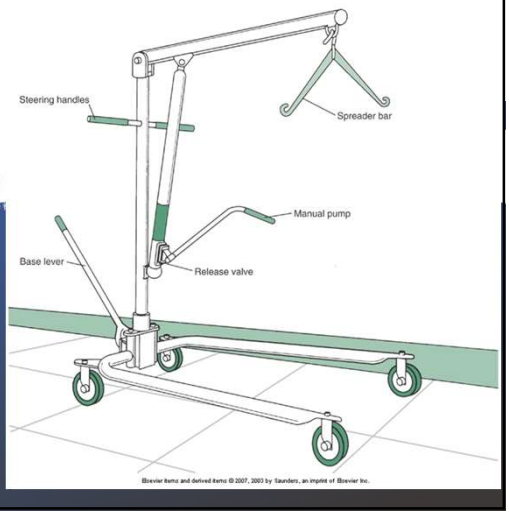


FIG. 13-7 Two-person lift. **A,** The first person asks the patient to cross his or her arms over the chest. The person making the transfer stands behind the patient, reaches under the patient's axillae, and grasps the patient's crossed forearms. The assistant squats in front of the patient and cradles the patient's thighs in one hand and the patient's calves in the other. **B,** At the command of the person supporting the patient's upper body, the patient is lifted to clear the wheelchair and moved as a unit to the desired place.

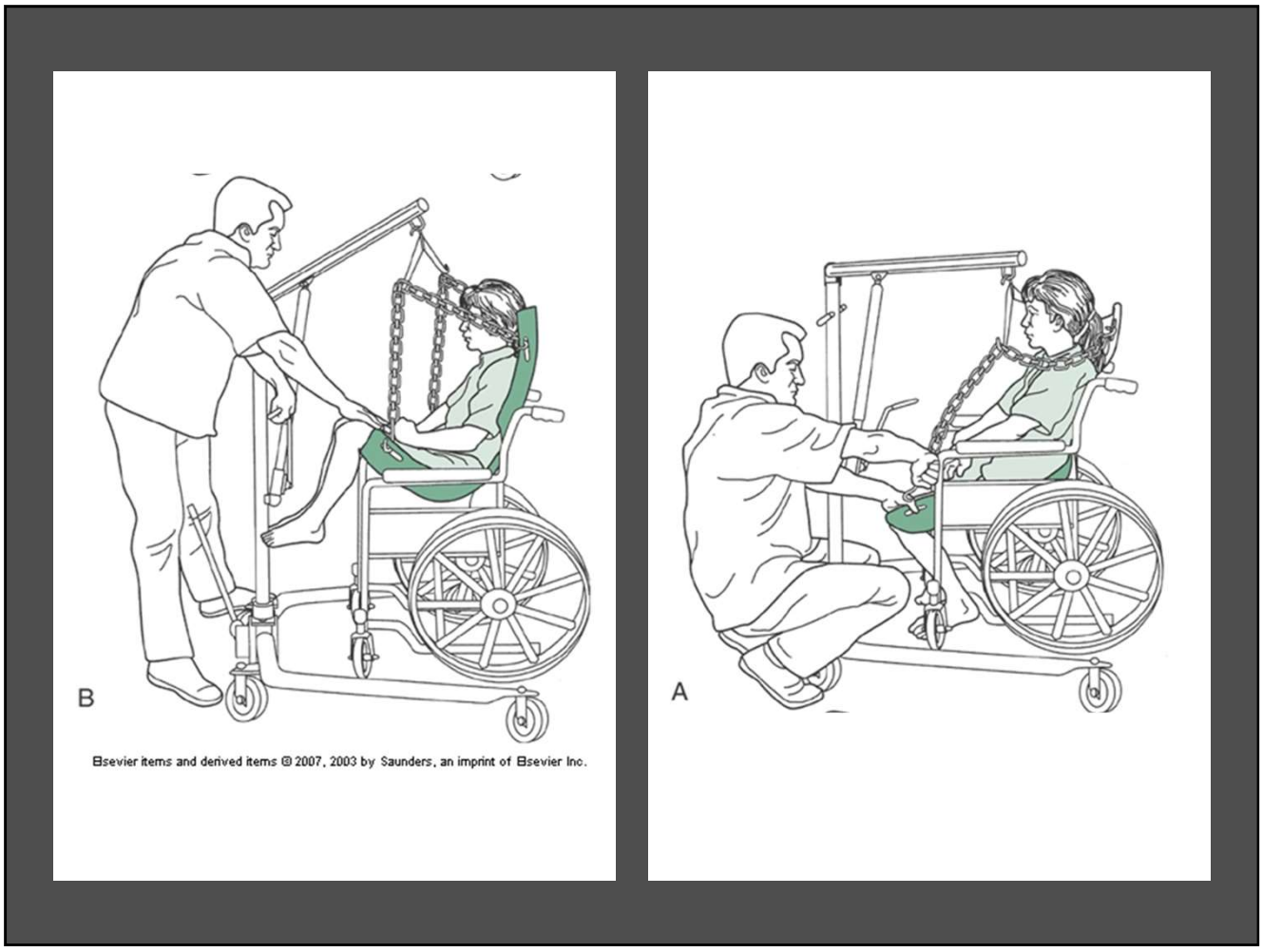
19

4. Hydraulic Lift Techniques

- Used for heavy patients
- Familiarize yourself thoroughly with lift operations before using this type of lift
- Patients need to be seated on a lift sling before using this type of lift
  - Sending a patient back to the floor to return sitting on a sling is better than risking injury to the patient, the transferrer, or both by attempting transfer without using a sling
- Communication is critical to lift success



20

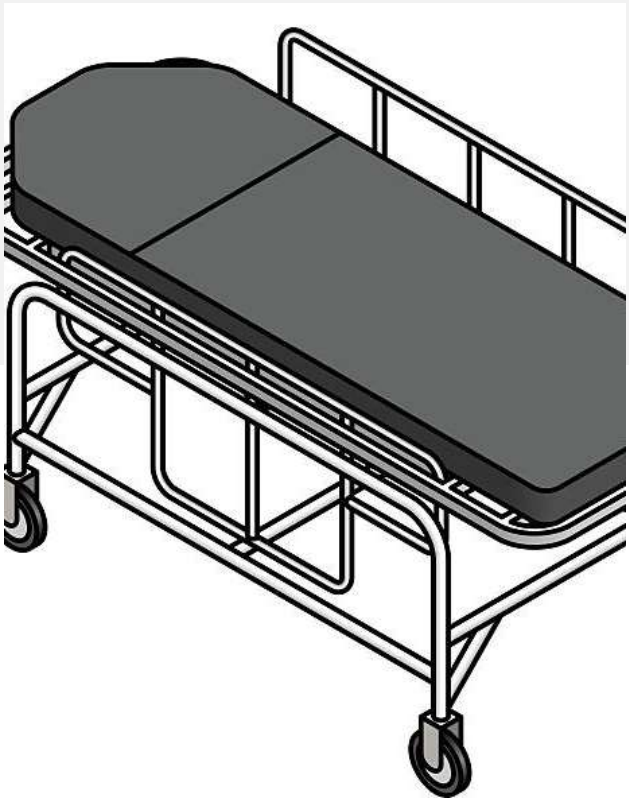

B
A
Elsevier items and derived items © 2007, 2003 by Saunders, an imprint of Elsevier Inc.

21

Maximove (hydraulic lift)

22

Stretcher Transfers (gurney or cart)



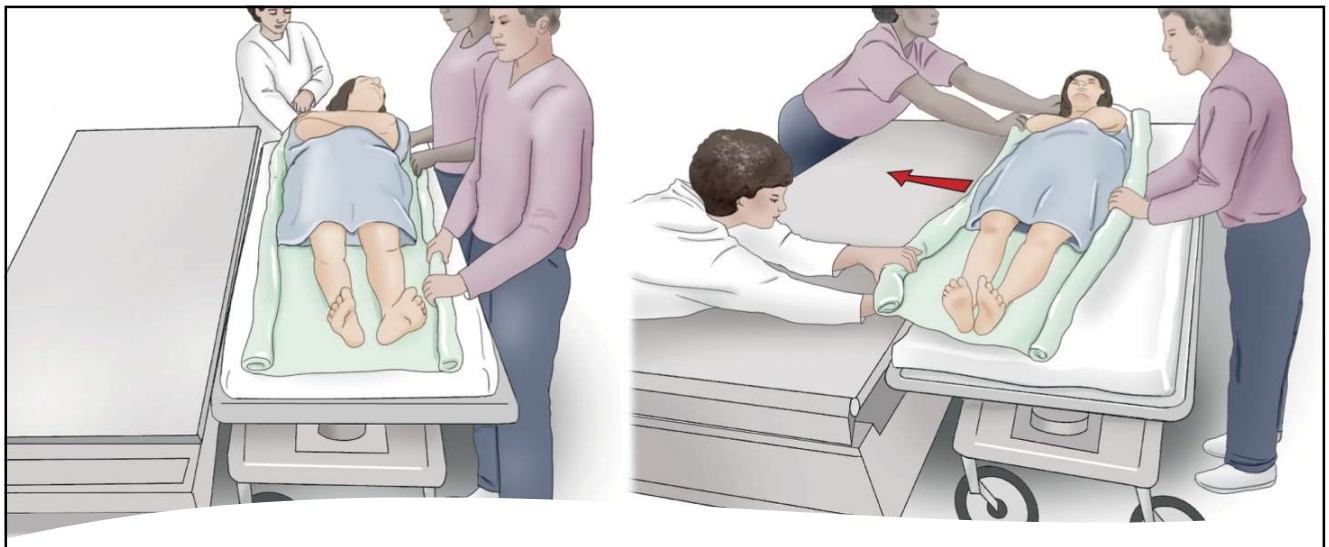
1. Sheet transfer
2. Three-carrier lift
3. Log roll

23

Things to remember:

- Try to avoid tearing the patient's skin, especially that of elderly patients
- Be aware of all IV tubing, oxygen tubing, catheters and drainage devices
- Have patient cross arms over her chest during transfer
  - Reduces surface area
  - Creates less friction during transfer

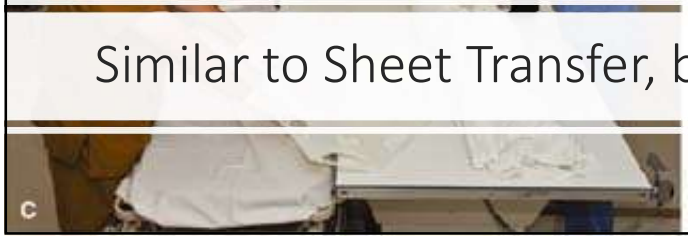
24



In General….

- Position litter/cart as close as possible to table
- Cart should be the same height as the table
- LOCK the wheels!
- Lower bed rails
- Best to have three people to move patient
  - Person at the head gives direction

25



Similar to Sheet Transfer, but using a Sliding board.

26

Assistive Devices to Transfer Bariatric Patients

Hovermatt

Bariatric Hoist

These products help manage the growing bariatric population with both sensitivity and safety by minimizing the physical demand of lateral transfers, vertical lifting, and repositioning for routine care.

27

Bariatric Transfer and Equipment Accomodations (Merrills Volume 1 Chapter 1)

- Transfer from litter/bed to x-ray table may require a greater number of personnel, up to 8 to 10 individuals, then is specified by department policy
- Obese patients are not manually lifted, they are moved by sliding
  - Such as Hovermatt or the high-capacity power lifts
- Upright images during fluoroscopy – foot board should be removed, allowing the patient to stand directly on the floor
  - Have a large study bench available in case patient becomes unstable or needs to sit
- Be knowledgeable of table weight limits
- Facilities provide larger wheelchairs and stretchers. In addition they may install larger doorways to accommodate larger transportation equipment

28

Log Roll

1. Logrolling is a technique used to turn a patient whose body must at all times be kept in a straight alignment (like a log).
2. This technique is used for the patient who has a spinal injury.
3. Logrolling is used for the patient who must be turned in one movement, without twisting.
4. Logrolling requires two people, or if the patient is large, three people.

http://www.google.com/url?sa=t&rct=j&q=patient%20log%20roll%20technique&source=video&cd=6&cad=rja&ved=0CE4QtwIwBQ&url=http%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DQhQDm60_Pxc&ei=QCQMUejpKIHl0gGV3ICQBg&usg=AFQjCNHLh5a-tnMB-mGp0ur9qRsdbKRJYQ

29

Falls and Fall Prevention

Falls are the most common hospital accident

30

What is a fall?

- An unplanned, sudden, descent to the floor
- With or without injury
- Can be result of physiological or environmental conditions
- An assisted fall is STILL considered a fall

31

Most Prone to Falling

- Elderly
- Frail
- Sensory deprivation
- Medicated (Sedated)

32

Factors that contribute to falls

- Age older than 65 years
- History of falls
- Impaired vision or balance
- Altered gait or posture, impaired mobility
- Medication regimen
- Postural hypotension
- Slowed reaction time
- Confusion or disorientation
- Unfamiliar environment

33

Prevention of Falls

- Understand condition of patient (SBAR handoff)
- Keep floors clear of objects which may obstruct pathway
- Keep equipment (wheelchairs, stretchers/litters etc.) in areas where they will not obstruct passageways
- Side rails up when on litter/stretcher (Always)
- Locks on wheelchairs or litters (Always when moving patient on/off)
- Always assist patient on/off the table (Ambulatory, litter, wheelchair)

34

- General considerations such as wear eyeglasses, non-skid slippers or shoes
- Keep call bell within reach & answer promptly
- Keep personal items within easy reach
- Keep assistive devices within easy reach if independently ambulatory
- Keep litter and wheelchair wheels in locked position
- Provide adequate lighting
- Reduce environmental clutter

STANDARD FALL PREVENTION INTERVENTIONS

35

Fall Prevention: Bed/Chair Exit Alarms

- Precautionary measure for patients who are at risk for falling
- Position sensor pad under shoulders (litter) & under buttocks (chair) with delay of zero
- Volume set at 10 & delay set at 0 seconds at all times
- Verify alarm is turned on each time**
- Never leave the patient alone without being certain that the green light is flashing which says the BED/CHAIR alarm is turned on

36

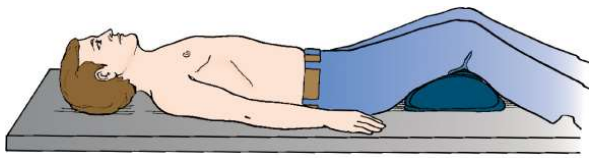
Positioning for safety, comfort or exams

- Patient should travel as a single unit
- Placed on table in a safe and secure position
- Moved segmentally into the desired body position
- Communicate
- Let patient assist as much as possible
- Always roll the patient toward you
- Provide positioning sponges to support the patient

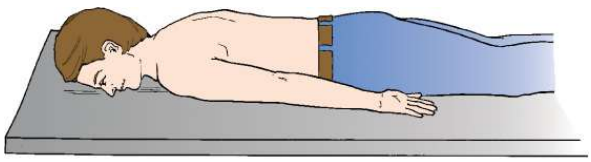
37

Positions to know as a Radiologic Technologist

38



Supine



Prone

Fowler

Used for gravity studies

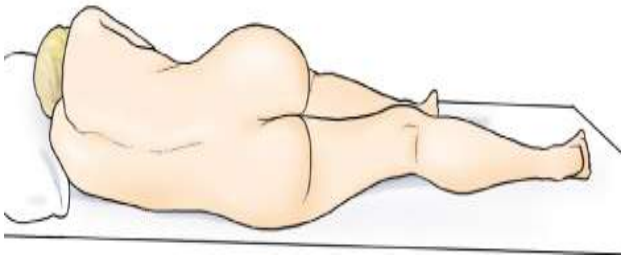
Modified Lithotomy

Used for Hysterosalpingogrm and OR cases

39

Trendelenburg

Used for fainting, shock, venous return

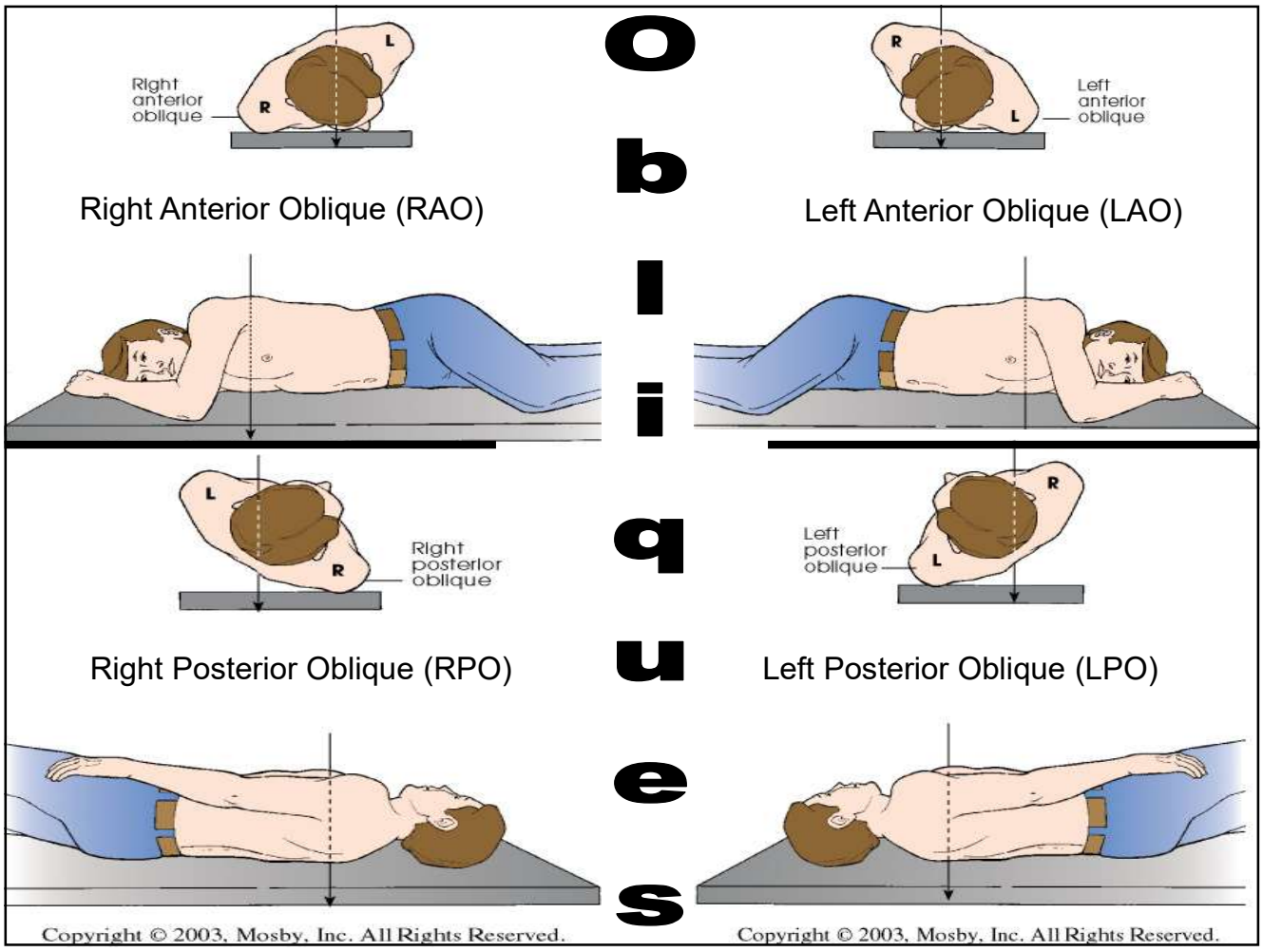


Sims

Used for enema tip insertion and rectal temps

40

Obliques


Right anterior oblique
L
R
Left anterior oblique
R
L
Right Anterior Oblique (RAO)
Left Anterior Oblique (LAO)
L
R
Right posterior oblique
Left posterior oblique
R
L
Right Posterior Oblique (RPO)
Left Posterior Oblique (LPO)
Copyright © 2003, Mosby, Inc. All Rights Reserved.
Copyright © 2003, Mosby, Inc. All Rights Reserved.

41

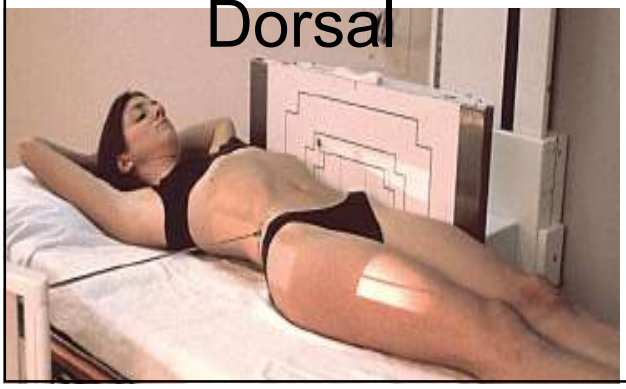
Right Lateral

Left Lateral

Decubitus

X-ray beam is in a horizontal position

Dorsal

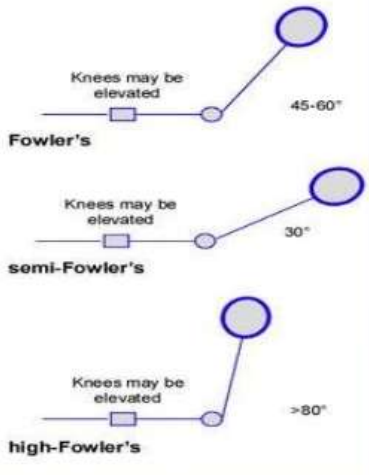


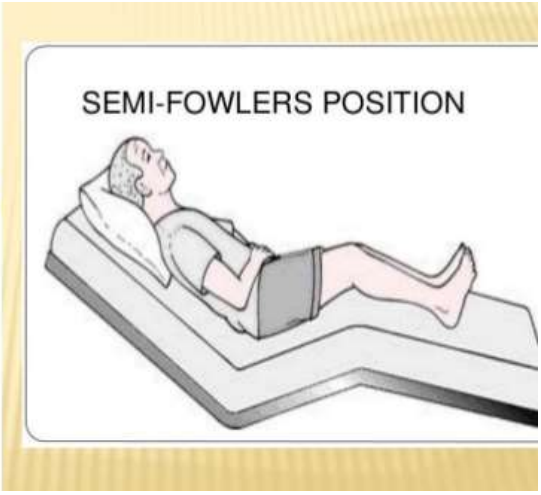
Ventral

42

Semi-Fowler

- An inclined position obtained by raising the head of the bed 25–40 cm, flexing the hips, and placing a support under the knees so that they are bent at approximately 90°, thereby allowing fluid in the abdominal cavity to collect in the pelvis.





http://www.medilexicon.com/medicaldictionary.php?t=71359

43

Immobilizations:
Act of rendering immovable

Motion is one of the biggest enemies of diagnostic images

Excessive motion on an image creates the need to repeat the image

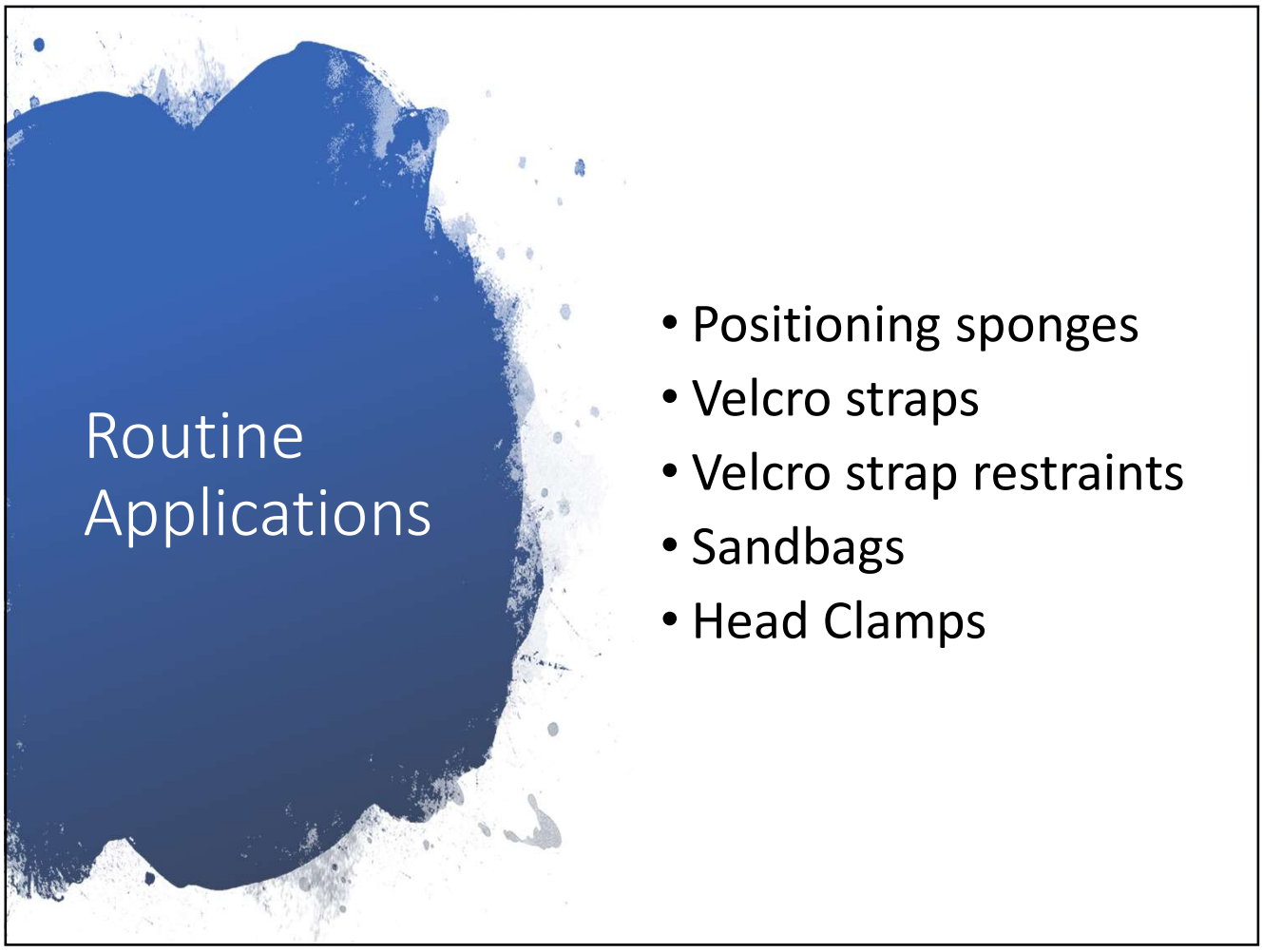
Increases radiation dose to patient

44

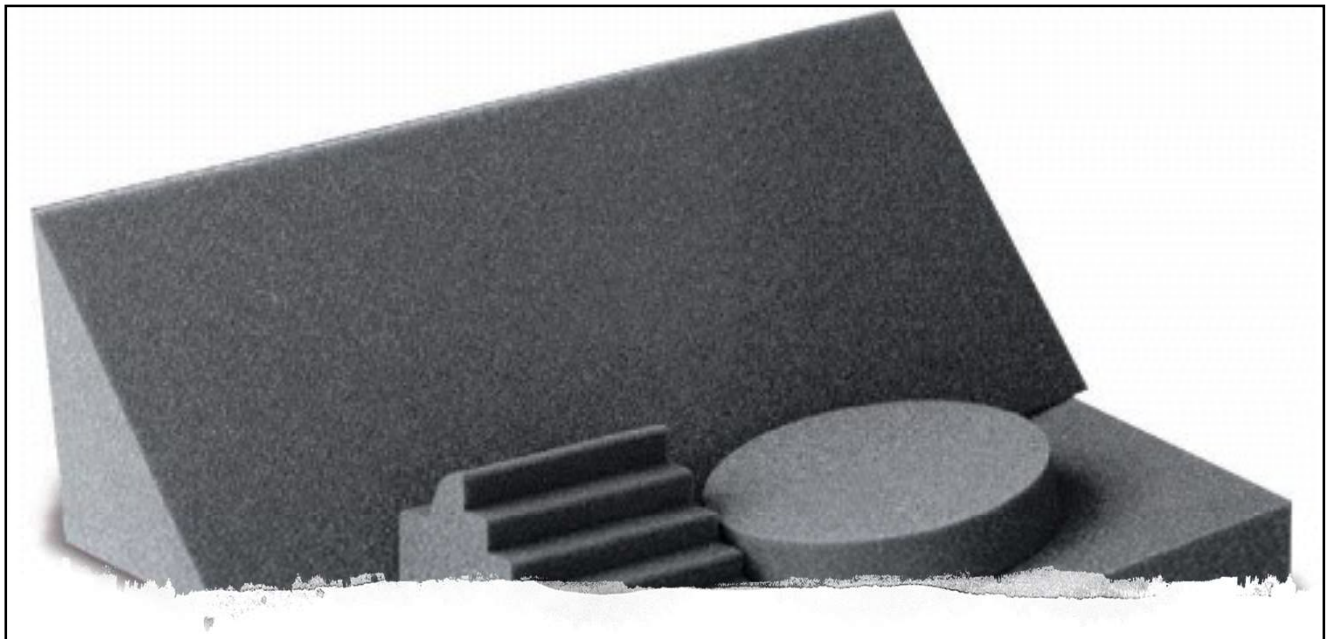
Communication

- One of the **most effective** means of reducing motion
  - Most patient motion is voluntary
- Need to establish rapport with patient
  - Relation of harmony and accord between two persons
  - Show empathy, respect and concern for patient
  - Patient will feel comfortable and be more likely to cooperate

45


Routine Applications
• Positioning sponges
• Velcro straps
• Velcro strap restraints
• Sandbags
• Head Clamps

46



Positioning Sponges

- Variety of shapes and sizes
- Reduce motion
- Support body part while reducing strain on patient
- Increase accuracy in positioning

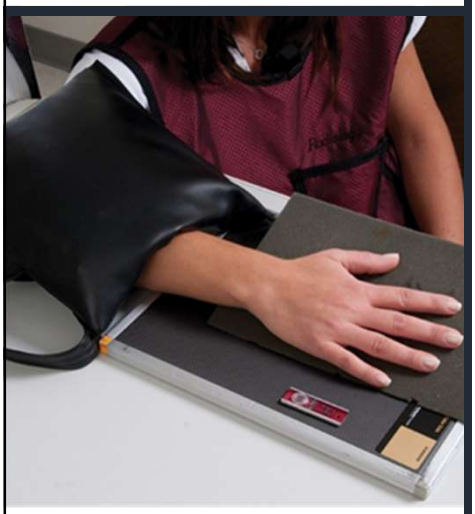
47

Velcro Straps

- Restraining or positioning devices
- Use for holding body parts into the proper positioning
  - Axial projection of a heel
- Used on table for patients who are not completely cognizant
  - Medications
  - Intoxication
  - Diminished mental capacities
- Used for compression
  - IVU
- Used to assist weak patients in semi-erect position
  - Prevents fall

48

Sandbags



- Useful for both positioning and immobilization
- May be used alone or with other positioning devices
- Radiopaque
  - Do not allow x-rays to pass through
- Need to be positioned out of the area of interest
- Other positioning aids are radiolucent

49

Head clamps

- Used for images of skull
- Used more for positioning rather than restraint
- Reminder to keep head still and reduce voluntary movement
- Patient is able to pull away

50

Restraints

A physician's order is required

Restraints should **NEVER** be used for staff convenience or client punishment.

51

Limb restraints can also be used

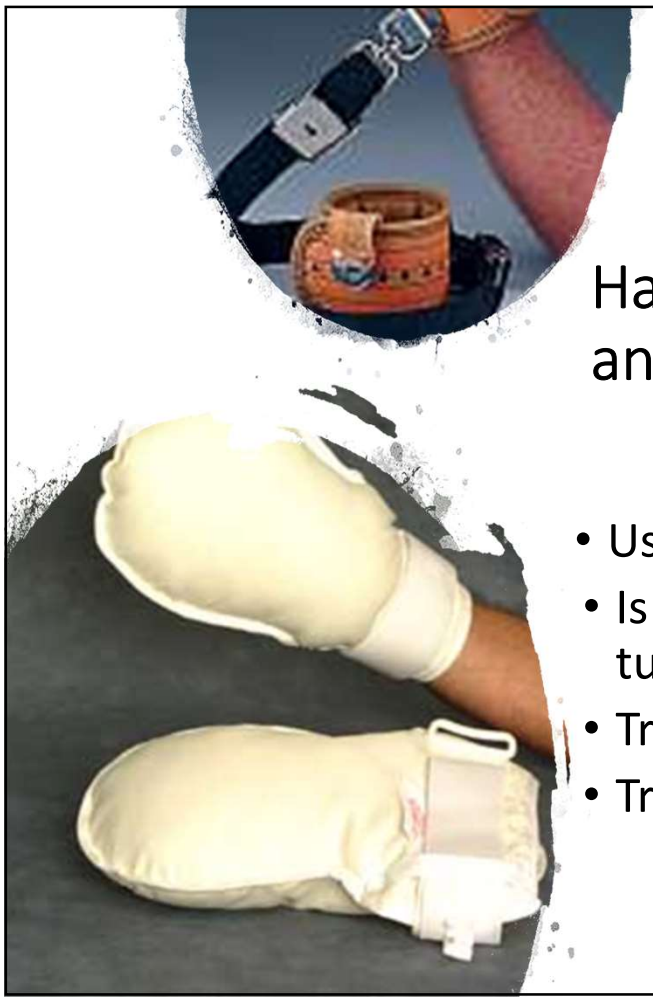
- Secure only on non-movable part of procedure table
- Not too tight
  - Should be able to insert one finger between device and limb
- Tied with a slip knot

52

Tie the half bow knot

- Quick release knot
- Secure restraints to frame, not to side rails
- http://www.youtube.com/watch?v=FGI8C2v8OYA

53



Hand or Mitt restraints and Locked restraints

- Used when a patient:
- Is confused and tries to remove tubes, lines and dressings
- Tries to inflict self-harm or injury
- Tries to inflict harm on others

54

Applications

- Trauma (will learn in medical emergencies)
- Pediatric
- Geriatric

55

Pediatric Applications

The following slides state restraint, but it is placed temporarily to assist in the positioning of an x-ray. Therefore a physicians order is not required.

56

- Again, communication should be your first means of immobilization
- Understanding leads to cooperation
  - "To stand tall in pediatrics, you have to get down on your knees."
    - Dr. Armand Brodeur
- Parents can remain in room to help hold child
  - Provide lead shields as needed
  - Make sure Mom isn't pregnant

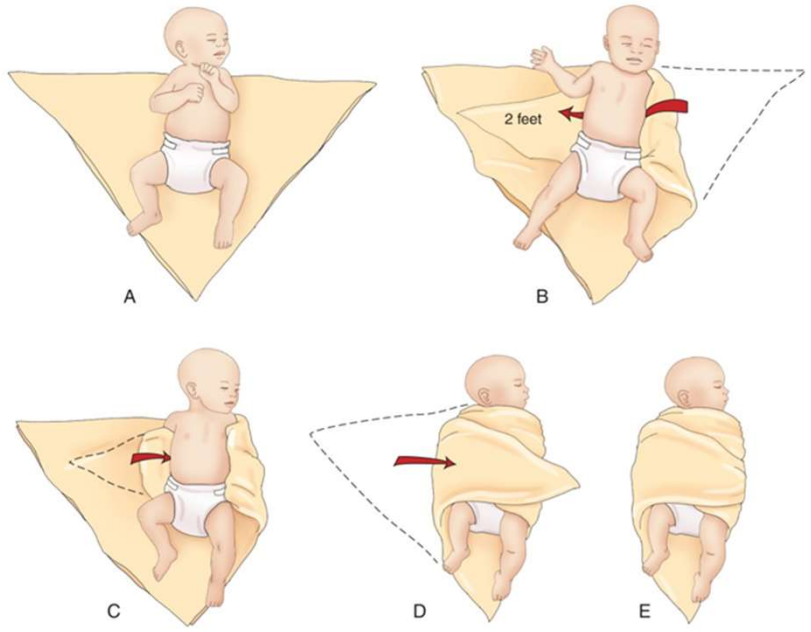
57

- Sheets or blankets as restraints
  - Mummification, swaddling, bunny technique
  - Wrapping the child properly in the sheet will reduce motion in the limbs

Sheet Restraint

58

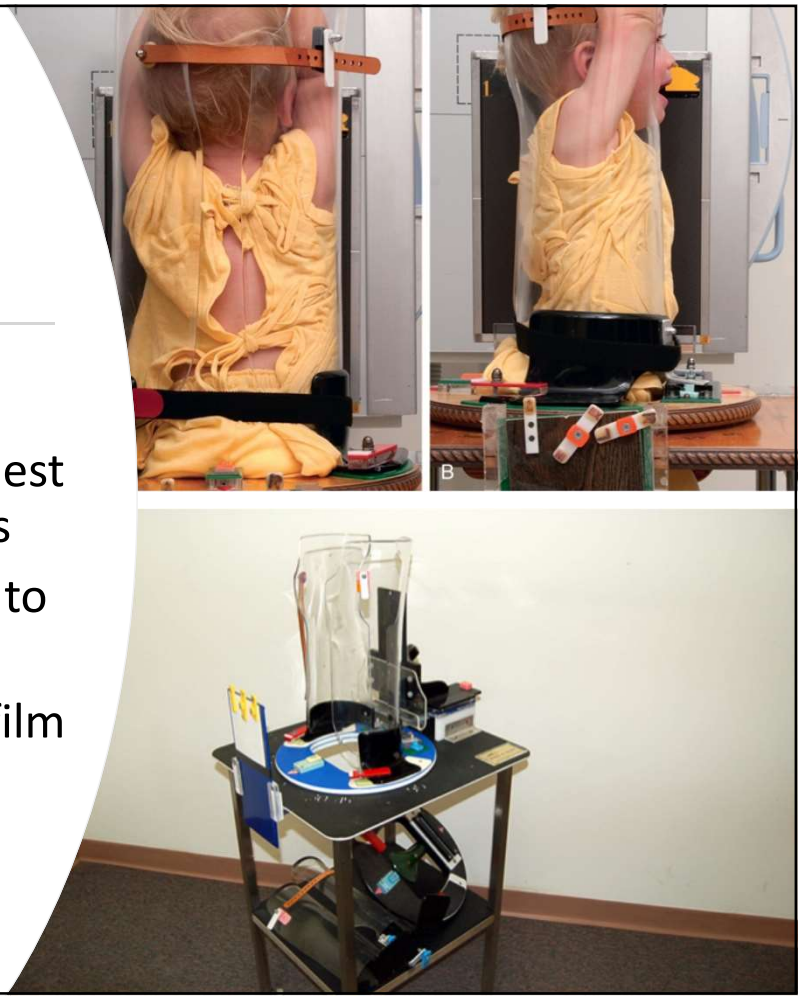
Pg. 160 Fig. 14-12



59

Pigg-O-Stat

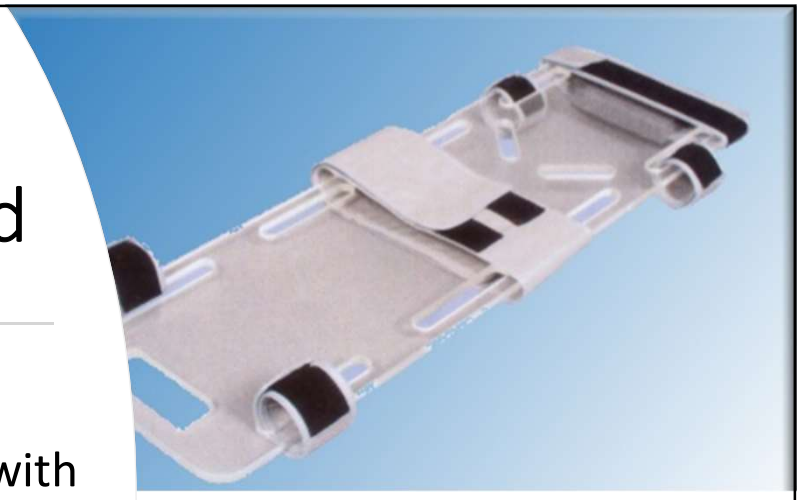
- Radiolucent device
- Useful for upright chest and abdomen images
- Designed for infants to child 3 years of age
- Includes shield and film holder
- Can be rotated 360°

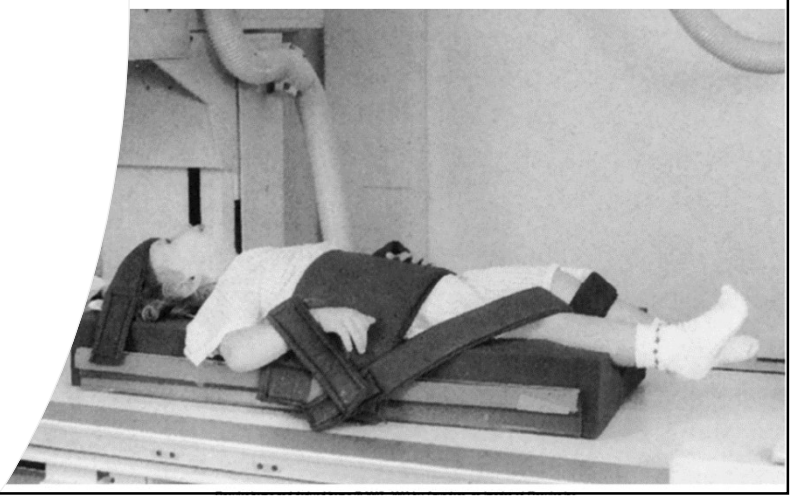


60

Restraint Board

- Several variations
- Contour-fitting pad with Velcro straps
- Good for abdomen images





61

Octostop

- Modification of restraint board
- Octagonal metal frame attached to end of board
- Velcro straps for head, torso and limbs
- Patient can be rotated 360°
- Useful for Fluoroscopy exams
- Can be used on children up to 12 months of age

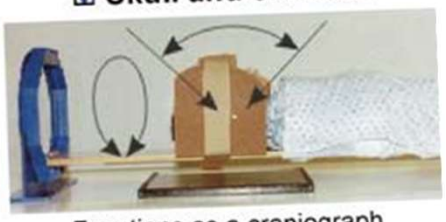
62

☑ Chest and abdomen
☑ Pyelography and cystography
☑ Upper G.I. and barium enema
☑ CT scan and MR

Carefully
selected wooden board, verified
and radio-transparent. On one octogon,
stable positions every 45°; on the support(s),
ISOCENTRIC rotation and stability in all positions.
Adapted head cushions, Velcro® straps and Velcro® blankets
for fast immobilization.

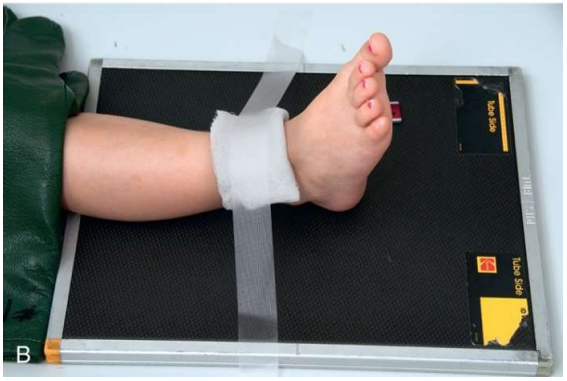
☆ *SIMPLE*
☆ *EFFICIENT*
☆ *INGENIOUS*
☆ *MODULAR*

☑ Skull and sinuses



Functions as a craniograph

63



Tape

- An invaluable tool for pediatrics and adults
- Can be used as a reminder to hold still
- Can also be used for actual immobilization
- Take care not to damage skin with tape
- Twist tape so sticky part doesn't touch skin
- Use gauze between tape and skin

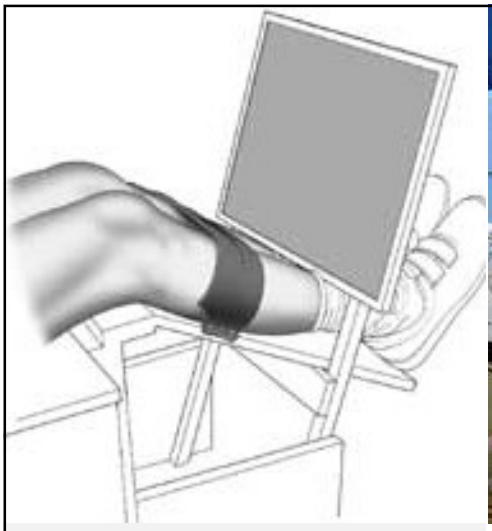
64

Geriatric Applications

65

- Many geriatric patients fear falling
- Cooperation is best achieved when patient feels secure
- Allow extra time for patient to move
- Ask another tech to help move patient
- Keep patient warm (Use warm blankets)
  - Reduces chills, which will reduce motion
- Use comfort measures for table exams
  - Radiolucent pad
  - Wedge sponge under knees when possible

66



OTHER CONVENTIONAL DEVICES

- Hip box – used to take images if there is a question of a fractured hip
- Merchant box – used for knee images
- Shoulder supports – used during myelograms and other procedures
- Hand supports – placed on tables to support patient when standing table into an upright position

67

NON-CONVENTIONAL DEVICES

- Sometimes you need to be **creative** when immobilizing body parts
- Most radiolucent objects can be useful in certain circumstances
  - Tongue depressors
  - Pens
  - Sheets/blankets/pads/pillows
- Your only limitation is your imagination!

68