Assessment Criteria and Care Plan for Safe Patient Handling and Movement

I. Patient’s Level of Assistance:
   - Independent—Patient performs task safely, with or without staff assistance, with or without assistive devices.
   - Partial Assist—Patient requires no more help than standby, cueing, or coaxing, or caregiver is required to lift no more than 35 lbs of a patient’s weight.
   - Dependent—Patient requires nurse to lift more than 35 lbs of the patient’s weight, or patient is unpredictable in the amount of assistance offered. In this case assistive devices should be used.

   An assessment should be made prior to each task if the patient has varying level of ability to assist due to medical reasons, fatigue, medications, etc. When in doubt, assume the patient cannot assist with the transfer/repositioning.

II. Weight-Bearing Capability
III. Bilateral Upper-Extremity Strength
   - Full
   - Partial
   - None

IV. Patient’s level of cooperation and comprehension:
   - Cooperative—may need prompting; able to follow simple commands.
   - Unpredictable or varies (patient whose behavior changes frequently should be considered as unpredictable), not cooperative, or unable to follow simple commands.

V. Weight: ___________ Height: ___________
   Body Mass Index (BMI) [needed if patient’s weight is over 300 lbs]¹: ___________

   If BMI exceeds 50, institute Bariatric Algorithms

   The presence of the following conditions are likely to affect the transfer/repositioning process and should be considered when identifying equipment and technique needed to move the patient.

VI. Check applicable conditions likely to affect transfer/repositioning techniques.
   - Hip/Knee/Shoulder Replacements
   - History of Falls
   - Paralysis/Paresis
   - Unstable Spine
   - Severe Edema
   - Very Fragile Skin
   - Respiratory/Cardiac Compromise
   - Wounds Affecting Transfer/Positioning
   - Amputation
   - Urinary/Fecal Stoma
   - Contractures/Spasms
   - Tubes (IV, Chest, etc.)
   - Fractures
   - Splints/Traction
   - Severe Osteoporosis
   - Severe Pain/Discomfort
   - Postural Hypotension

   Comments: __________________________________________________________________________________________

VII. Appropriate Lift/Transfer Devices Needed:

   Vertical Lift: ________________________________________________________________

   Horizontal Lift: ________________________________________________________________

   Other Patient Handling Devices Needed: ____________________________________________

   Sling Type: Seated _____ Seated (Amputee) _____ Standing _____ Supine _____ Ambulation _____ Limb Support _____

   Sling Size: __________

   Signature: ________________________________ Date: _________________

¹If patient’s weight is over 300 lbs, the BMI is needed. For Online BMI table and calculator see: http://www.nhlbi.nih.gov/guidelines/obesity/bmi_tbl.htm
Algorithm 1: Transfer to and From: Bed to Chair, Chair to Toilet, Chair to Chair, or Car to Chair
Last rev. 10/012008

Start Here

Can patient bear weight?

Fully
Caregiver assistance not needed; Stand by for safety as needed.

No

Partially

Is the patient cooperative?

Yes
Stand-and-pivot technique using a gait/transfer belt (1 caregiver) or powered stand-assist lift (1 caregiver).

No

Use full-body sling lift and 2 caregivers.

Does the patient have upper-extremity strength?

Yes
Seated transfer aid; may use gait/transfer belt until the patient is proficient in completing transfer independently.

No

- For seated transfer aid, must have chair with arms that recess or are removable.
- For full body sling lift, select a lift that was specifically designed to access a patient from the car (if the car is the starting or ending destination).
- If patient has partial weight-bearing capacity, transfer toward stronger side.
- Toileting slings are available for toileting.
- Mesh slings are available for bathing.
- During any patient-transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used for the transfer. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
Algorithm 2: Lateral Transfer To and From: Bed to Stretcher, Trolley
Last rev. 01/13/2009

Start Here

Can patient assist?

Partially Able or Not At All Able

> 200 Pounds: Use a ceiling lift with supine sling, a mechanical lateral transfer device or air-assisted device and 3 caregivers.

< 200 Pounds: Use a friction-reducing device and/or a lateral transfer board.

Caregiver assistance not needed; Stand by for safety as needed.

- Destination surface should be 1/2" lower for all lateral patient moves.
- For patients with Stage III or IV pressure ulcers, care must be taken to avoid shearing force.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used for the transfer. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)

Can patient assist?

Partially Able or Not At All Able
Algorithm 3: Transfer To and From: Chair to Stretcher or Chair to Exam Table
Last rev. 10/01/08

Start Here

Is the patient cooperative?

Yes

Caregiver assistance not needed; Stand by for safety as needed.

No

Use floor-based lift and 2 or more caregivers.

Can the patient bear weight?

Fully

If exam table/stretcher can be positioned to a low level, use non-powered stand-assist. If not, use a full-body sling lift.

Partially

Use floor-based lift and 2 or more caregivers.

No

Use floor-based lift and 2 or more caregivers.

- High/Low exam tables and stretchers would be ideal.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used for the transfer. (Waters, T. [2007]. When is it safe to manually lift a patient? *American Journal of Nursing, 107*(8), 53-59.)
This is not a one person task: DO NOT PULL FROM HEAD OF BED.
When pulling a patient up in bed, the bed should be flat or in a Trendelenburg position (when tolerated) to aid in gravity, with the side rail down.
For patients with Stage III or IV pressure ulcers, care should be taken to avoid shearing force.
The height of the bed should be appropriate for staff safety (at the elbows).
If the patient can assist when repositioning “up in bed,” ask the patient to flex the knees and push on the count of three.
During any patient handling task, if the caregiver is required to lift more than 35 lbs of a patient’s weight, then the patient should be considered to be fully dependent and assistive devices should be used.
(Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
- Take full advantage of chair functions, e.g., chair that reclines, or use arm rest of chair to facilitate repositioning.
- Make sure the chair wheels are locked.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
Algorithm 6: Transfer a Patient Up From the Floor
Last rev. 10/01/08

- Use floor-based lift that goes all the way down to the floor (most of the newer models are capable of this).
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
Bariatric Algorithm 1: Bariatric Transfer To and From: Bed/Chair, Chair/Toilet, or Chair/Chair

**Start Here**

- Can patient bear weight?
  - Fully: Stand by for safety as needed*
  - Partially or No:
    - Is the patient cooperative?
      - Partially or No: Bariatric floor-based or ceiling lift (minimum of 3 caregivers)
      - Fully:
        - Does the patient have upper-extremity strength?
          - Fully: Bariatric stand-assist lift (minimum of 2 caregivers) OR Bariatric floor-based or ceiling lift (minimum of 2 caregivers)
          - Partially or No:
            - Use seated bariatric transfer aid; may use sliding board until the patient is proficient in completing transfer independently (minimum of 2 caregivers)

* "Stand by for safety." In most cases, if a bariatric patient is about to fall, there is very little that the caregiver can do to prevent the fall. The caregiver should be prepared to move any items out of the way that could cause injury, try to protect the patient's head from striking any objects or the floor and seek assistance as needed once the person has fallen.

- If patient has partial weight-bearing capability, transfer toward stronger side.
- Consider using an abdominal binder if the patient's abdomen impairs a patient-handling task.
- Assure equipment used meets weight requirements. Standard equipment is generally limited to 250-350 lbs. Facilities should apply a sticker to all bariatric equipment with "EC" (for expanded capacity) and a space for the manufacturer's rated weight capacity for that particular equipment model.
- Identify a leader when performing tasks with multiple caregivers. This will assure that the task is synchronized for increased safety of the health care provider and the patient.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
Bariatric Algorithm 2: Bariatric Lateral Transfer To and From: Bed/Stretcher/Trolley
rev. 10/01/08

- Can patient assist?
  - Fully
  - Partially Able or No

- Mechanical lateral transfer device, bariatric ceiling lift with supine sling or air assisted friction-reducing device (minimum of 3 caregivers)**

- Stand by for safety as needed* (minimum of 2 caregivers)

The destination surface should be about 1/2" lower for all lateral patient moves.
- Avoid shearing force.
- Make sure bed is the right width, so excessive reaching by caregiver is not required.
- Lateral transfers should not be used with specialty beds that interfere with the transfer.
  - In this case, use a bariatric ceiling lift with supine sling.
- Ensure bed or stretcher doesn't move with the weight of the patient transferring.
** Use a bariatric stretcher or trolley if patient exceeds weight capacity of traditional equipment.

* "Stand by for safety." In most cases, if a bariatric patient is about to fall, there is very little that the caregiver can do to prevent the fall. The caregiver should be prepared to move any items out of the way that could cause injury, try to protect the patient's head from striking any objects or the floor and seek assistance as needed once the person has fallen.

* Assure equipment used meets weight requirements. Standard equipment is generally limited to 250-350 lbs. Facilities should apply a sticker to all bariatric equipment with "EC" (for expanded capacity) and a space for the manufacturer's rated weight capacity for that particular equipment model.

* If patient has partial weight-bearing capability, transfer toward stronger side.

* Consider using an abdominal binder if the patient's abdomen impairs a patient-handling task.

* Identify a leader when performing tasks with multiple caregivers. This will assure that the task is synchronized for increased safety of the health care provider and the patient.

* During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
Bariatric Algorithm 3: Bariatric Reposition in Bed: Side-to-Side, Up in Bed

Start Here

Can patient assist?

- Fully: Caregiver assistance not needed; patient may/may not use weight-specific positioning aid

- Partially or No

  Is patient cooperative?

- Fully: Bariatric ceiling lift with supine sling, air-assisted device or friction-reducing aid (minimum of 2-3 caregivers)

- Partially or No

  Bariatric ceiling lift with supine sling, air-assisted device or friction-reducing aid (minimum of 3 caregivers)

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- When pulling a patient up in bed, place the bed flat or in a Trendelenburg position (if tolerated and not medically contraindicated) to aid in gravity; the side rail should be down.
- Avoid shearing force.
- Adjust the height of the bed to elbow height.
- Mobilize the patient as early as possible to avoid weakness resulting from bed rest. This will promote patient independence and reduce the number of high-risk tasks caregivers will provide.
- Consider leaving a friction-reducing device covered with drawsheet, under patient at all times to minimize risk to staff during transfers as long as it doesn't negate the pressure relief qualities of the mattress/overlay.
- Use a sealed, high-density, foam wedge to firmly reposition patient on side. Skid-resistant texture materials vary and come in set shapes and cut-your-own rolls. Examples include:
  - Dycem (TM)
  - Scoot-Guard (TM): antimicrobial; clean with soap and water, air dry.
  - Posey-Grip (TM): Posey-Grip does not hold when wet. Washable, reusable, air dry.

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- If patient has partial weight-bearing capability, transfer toward stronger side.
- Consider using an abdominal binder if the patient's abdomen impairs a patient-handling task.
- Assure equipment used meets weight requirements. Standard equipment is generally limited to 250-350 lbs. Facilities should apply a sticker to all bariatric equipment with "EC" (for expanded capacity) and a space for the manufacturer's rated weight capacity for that particular equipment model.
- Identify a leader when performing tasks with multiple caregivers. This will assure that the task is synchronized for increased safety of the healthcare provider and the patient.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
Can patient assist?

- Stand by for safety as needed*

- Partially or No

- Is patient cooperative?

- Fully

- Partially or No

- Bariatric ceiling lift, floor-based lift, repositioning device or seated friction-reducing device (minimum of 2 caregivers)

- Fully

- Take full advantage of chair functions, e.g., chair that reclines, or use an arm rest of chair to facilitate repositioning.
- Make sure the chair wheels are locked.
- Consider leaving the sling under the patient at all times to minimize risk to staff during transfers after carefully considering skin risk to patient and the risk of removing/replacing the sling for subsequent moves.

* "Stand by for safety." In most cases, if a bariatric patient is about to fall, there is very little that the caregiver can do to prevent the fall. The caregiver should be prepared to move any items out of the way that could cause injury, try to protect the patient's head from striking any objects or the floor and seek assistance as needed once the person has fallen.
- If patient has partial weight-bearing capability, transfer toward stronger side.
- Consider using an abdominal binder if the patient's abdomen impairs a patient handling task.
- Assure equipment used meets weight requirements. Standard equipment is generally limited to 250-350 lbs. Facilities should apply a sticker to all bariatric equipment with "EC" (for expanded capacity) and a space for the manufacturer's rated weight capacity for that particular equipment model.
- Identify a leader when performing tasks with multiple caregivers. This will assure that the task is synchronized for increased safety of the healthcare provider and the patient.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? *American Journal of Nursing, 107*(8), 53-59.)
Bariatric Algorithm 5: Patient-Handling Tasks Requiring Access to Body Parts (Limb, Abdominal Mass, Gluteal Area)
rev. 10/01/08

Start Here

Can patient sustain limb position to assist in making body part accessible?

Proceed with patient-handling task

Fully

Partially or No

Assemble multidisciplinary team to develop creative solutions that are safe for patient and caregiver.

Examples:
- Modify use of a full body sling lift to elevate limbs for bathing or wound care (i.e. bariatric limb sling).
- Use draw sheet with handles for 2 caregivers (one per side) to elevate abdominal mass to access the perineal area (e.g., catheterization, wound care).
- To facilitate drying a patient between skin folds, use the air-assisted lateral transfer aid to blow air or use a hair dryer on a cool setting.
- Use sealed high-density foam wedge to firmly reposition patient on side. Skid-resistant texture materials vary and come in set shapes and cut-your-own rolls. Examples include:
  - Dycem(TM)
  - Scoot-Guard(TM): antimicrobial; clean with soap and water, air dry.
  - Posey-Grip(TM): Posey-Grip does not hold when wet. Washable, reusable, air dry.

A multidisciplinary team needs to problem solve these tasks, communicate to all caregivers, refine as needed and perform consistently.
- Consider using an abdominal binder if the patient's abdomen impairs a patient handling task.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107(8), 53-59.)
• If the patient has respiratory distress, the stretcher must have the capability of maintaining a high Fowler's position.
• Newer equipment often is easier to propel.
• If patient is uncooperative, secure patient in stretcher.
• During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
**Considerations:**
- Is bathroom doorway wide enough to accommodate entry of mechanical lift device and patient?
- Assure equipment used meets weight requirements and is appropriately sized for patient.
- Typically, standard toilets are rated to 350 lbs maximum capacity.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight, then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107[8], 53-59.)
Bariatric Algorithm 8: Transfer a Bariatric Patient Up From the Floor
Last rev. 10/1/08

Was the patient injured?

Assess for fracture or spinal cord injury. Does patient need immobilization technique?

Can patient assist?

- Caregiver is to secure chair beside patient.
- Using the chair, have patient use own strength to raise self.
- Do not tug on patient or lift patient.

- Total lift device needed using two or more caregivers.
- Hover Jack with friction-reducing sheets and 2 caregivers.

- If patient is in cardiac arrest initiate CPR and wait for emergency response team before moving.
- If spinal board is necessary use 2 friction-reducing sheets to transfer the patient onto spinal board.
- Obtain low stretcher.
- Lift patient on spinal board onto low-lying stretcher using 6 caregivers.
- If caregivers are familiar with scoop stretcher it may be used as an option.
- Spinal board and Hover Jack are also options.

- Do not lift patient off floor.
- Do not allow patient to lean on caregiver for base of support.
- "Immobilization Technique" definition: use spinal precautions if can't use lift due to suspect hip, pelvic, or vertebral fractures.
- Use floor-based lift that goes all the way down to the floor (most of the newer models are capable of this).
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs of a patient's weight then the patient should be considered to be fully dependent and assistive devices should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107(8), 53-59.)
Orthopaedic Algorithm #1: Turning Patient in Bed (Side-to-Side)
Patient with Orthopaedic Impairments
September 25, 2008

START

Is the patient cooperative?

No
Use a mechanical device\(^1,2,3\) or bed-assisted technology (min. 2 caregivers)

Yes

Caregiver assistance not needed; patient may/may not use a bed-mounted repositioning aid

Fully
Can patient assist?

No
Encourage patient to assist using a position aid (repositioning pole or side rail) (see recommendations by weight (next 3 boxes))

Partially

< 78 lbs/(35 kg.)
Use manual repositioning (min. 1 caregiver)

78-156 lbs/(35-69 kg.)
Use a mechanical device\(^3\) or bed-assisted technology (air bladder or bed-repositioning system) (min. 2 caregivers)

156-234 lbs/(69-106 kg.)
Use a mechanical device\(^3\) or bed-assisted technology (air bladder or bed-repositioning system) (min. 3 caregivers)

FOOTNOTES:
1. Maintain orthopaedic precautions as prescribed while performing this activity such as total hip, knee, shoulder, or spine precautions.
2. Select sling to meet and maintain the patient’s pre-op or post-op positioning guideline/precautions for the affected limb/body part(s).
   For more information on sling section, see Appendix A.
3. Examples of repositioning mechanical devices are: Turning clips: these simple slips attach to a bed sheet and can be used with a floor-based lift or ceiling-based lift to facilitate turning a patient. Turning straps/slings: one end of these straps or slings is connected to the bed and the other end is attached to either a ceiling or floor based lift to facilitate turning the patient. Powered mechanical devices: a ceiling lift is a powered overhead lift that can be used with a repositioning sling to turn a patient in bed. Friction reducing devices: either tubular in design, or two separate pieces of material are placed under the patient to assist in turning the patient in bed or moving the patient to the head of the bed. Pulley systems: these devices work by use of a pulley system and an overhead frame. The user turns a crank, which engages the pulley system to retract straps that are connected to a rod and bed sheet, thus turning the patient on the side.
4. If the patient weighs more than 234 lbs. mechanical assistive devices should be used to assist. Use your best clinical judgment for the number of caregivers required to assist.

GENERAL NOTES:
• For any patient who has, or is at risk for a pressure ulcer, care should be taken to avoid shearing force (such as using a friction reducing device for repositioning in bed). Shearing force is when there are two forces moving in opposite directions adjacent to each other (like scissors).
• The height of the bed should be appropriate for staff safety (at elbow height).
• During any patient handling task, if the caregiver is required to lift more than 35 lbs./16 kg.) of a patient’s weight, then the patient should be considered fully dependent and an assistive device should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107(8), 53-59).
Orthopaedic Algorithm #2: Vertical Transfer of a Post-Operative Total Hip Replacement Patient (Bed to Chair, Chair to Toilet, Chair to Chair, or Car to Chair)

September 25, 2008

START

Is the patient cooperative?

Yes

Use mobility aid as prescribed (e.g., walker, cane, crutches); caregiver assistance not needed; stand by for safety as needed.

No

Can the patient bear weight with lower extremities?

Fully

Partially

Stand and pivot technique using a gait/transfer belt (1 caregiver) or powered standing assist lift (1 caregiver).

Use a mechanical lift (min. 2 caregivers)

FOOTNOTES:

1. See 1A, 1B, 1C, 1D below for techniques to position patient at side of bed.

1A. Moving from supine head of bed elevated to sitting at edge of bed requires: Patient's ability to shift their seated weight in a sitting position. Typically accomplished by unweighting one buttock and moving it toward the edge of the bed; repeating this in alternating fashion until patient is sitting at edge of bed.

1B. With an impaired upper or lower extremity, caregiver might need to support the limb while patient attempts #1A.

1C. If patient is unable to accomplish #1A with #1B and the amount of assistance from caregiver will exceed 35 lbs., then a mechanical lift device should be used to achieve sitting position at the edge of the bed.

1D. Anti-friction sheets and seated discs might be useful when the amount of caregiver assistance is close to recommended limits; be aware of skin shearing risks. Shearing forces are caused when there are two forces moving in opposite directions adjacent to each other (like scissors).

2. Maintain orthopaedic precautions as prescribed while performing this activity such as total hip, knee, shoulder, or spine precautions.

3. Select sling to meet and maintain the patient's pre-op or post-op positioning guideline/precautions for the affected limb/body part(s). For more information on sling section, see Appendix A.

4. This will include situations where the patient may be allowed: a) Limited weight bearing on one lower extremity and full weight bearing on the other extremity; b) Partial weight bearing through both lower extremities.

GENERAL NOTES:

• If patient has partial weight bearing capacity, transfer toward stronger side.

• For car transfers: a) If patient cannot tolerate a seated position when doing a car transfer use a stretcher transfer or alternative transportation may be required; b) All car transports should comply with state laws for both children and adults; c) Don't forget to use all of the features of the car (i.e., adjustability of the seat) during the transfer.

• The height of the bed should be appropriate for staff safety (at elbow height).

• During any patient handling task, if the caregiver is required to lift more than 35 lbs./(16 kg.) of a patient's weight, then the patient should be considered fully dependent and an assistive device should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107(8), 53-59).
Orthopaedic Algorithm #3: Vertical Transfer of a Patient with an Extremity Cast/Splint
September 25, 2008

FOOTNOTES:
1. Moving from supine head of bed elevated to sitting at edge of bed requires a patient's ability to shift their seated weight in a sitting position:
   a. When assistance is not required, this is typically accomplished by unweighting one buttock and moving it toward the edge of the bed; repeating this in alternating fashion, until patient is sitting at the edge of the bed.
   b. With an impaired upper or lower extremity:
      • if the amount of assistance from caregiver does not exceed 35 lbs., caregiver may provide limb support while patient moves unassisted to side of bed (see a. above)
      • if the amount of assistance from caregiver may exceed 35 lbs., then a limb support strap/sling with a mechanical lift will provide limb support while patient moves unassisted to side of bed (see 1a. above)
   c. If patient is unable to accomplish a. and/or b. then utilize one of the following options:
      • mechanical lift device with a seated sling to lift patient to side of bed
      • friction-reducing device to assist staff in pulling patient to side of bed.
   d. Friction-reducing devices and seated discs may be useful when the amount of caregiver assistance is close to recommended limits, but be aware of skin shearing risks. Shearing is caused when there are two forces moving in opposite directions adjacent to each other (like scissors).
2. Select sling to meet and maintain the patient's pre-op or post-op positioning guideline/precautions for the affected limb/body part(s).
   For more information on sling selection, see Appendix A.
3. Patient can bear weight on one leg only (e.g., weight bearing on unaffected limb or limited weight bearing on affected limb).

GENERAL NOTES:
• Need to test the fit of the sling with an immobilized extremity.
• Maintain affected extremity immobilization/alignment.
• Use lift device with limb sling if applicable.
• During any patient handling task, if the caregiver is required to lift more than 35 lbs./(16 kg.) of a patient's weight, then the patient should be considered fully dependent and an assistive device should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107(8), 53-59).
Orthopaedic Algorithm #4: Ambulation
September 25, 2008

[Diagram]

Can patient bear weight on lower extremities?1

- Yes
  - High Risk5
    - Does patient have upper extremity strength and ability to grasp with at least one hand?
      - Yes: Use ceiling lift or floor-based lift with ambulation sling (1-2 caregivers) or sit to stand lift with ambulation capability.
      - No: Stand by for safety as needed. Use assistive devices as prescribed or as determined by team (crutches, walker, cane) (1-2 caregivers).

- No
  - Low Risk4
    - Is patient a safety risk?
      - Yes: Use ceiling lift or floor-based lift with ambulation sling (1-2 caregivers).
      - No: Use ceiling lift or floor-based lift with ambulation sling (1-2 caregivers) or sit to stand lift with ambulation capability.

- Partially or Fully
  - Stand by for safety as needed. Use assistive devices as prescribed or as determined by team (crutches, walker, cane) (1-2 caregivers).

FOOTNOTES:
1. Non-weight bearing: Patient is unable to bear weight through both lower extremities or weight-bearing through both lower extremities is contraindicated.
2. Partial weight bearing: This will include situations where the patient may be allowed: a) Limited weight bearing on one lower extremity and full weight bearing on the other extremity; b) Partial weight bearing through both lower extremities.
3. Safety risks may include: decreased cognition; decreased ability to cooperate; combativeness; medical stability.
4. Factors that contribute to low safety risk: a) Lack of combativeness; b) Ability to follow commands; c) Medical stability; d) Experience with the assistive device.
5. Factors that contribute to high safety risk: a) Combativeness; b) Lack of ability to follow commands; c) Medical instability; d) Lack of experience with the assistive device; e) Neurological deficits.

GENERAL COMMENTS/DISCUSSION:
- In healthcare, weight-bearing is often used to describe the amount of weight bearing that the patient can or has done. In orthopedics, weight-bearing status is prescribed by the physician based on the patient's ability to safely bear weight through the musculoskeletal system. Exceeding the prescribed weight-bearing status may be detrimental to the patient.
- Patients should be assessed for safety risks as described above. If patients are determined to be at significant risk for falls, then caregivers assisting with ambulation are also at risk for assisting patients to prevent falls. In high risk situations precautions should be taken, and devices such as walking slings should be used. At some point in care, the team will need to weigh the risks of falls with the benefits of ambulation and take a "therapeutic" risk in order to functionally advance the patient.
- Need to test the fit of the sling with an immobilized leg. For more information on on sling selection, see Appendix A.
- Maintain affected extremity immobilization/alignment.
- During any patient handling task, if the caregiver is required to lift more than 35 lbs. (16 kg.) of a patient's weight, then the patient should be considered fully dependent and an assistive device should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107(8), 53-59).
Orthopaedic Clinical Tool #1: Lifting and Holding Legs or Arms in an Orthopaedic Setting

Introduction

Often when orthopaedic care is being provided, the care giver must lift and/or hold a limb in place while some type of treatment is being provided, such as cast application. It is assumed that you are maintaining a neutral (upright) body posture (not fully flexed); adjust the height of the table. When a caregiver must lift a leg or arm, it is important to make sure that the weight of the limb being lifted does not exceed the strength capability of the caregiver. An ergonomic tool has been developed to assist caregivers in determining whether a specific lift and/or hold of a limb is acceptable and whether some type of lift or hold assist device is needed. For lifts of limbs with casts, an alternate method is presented for assessing whether the lift is acceptable or not as presented in Table #1.

This tool shows the calculation of the average weight for an adult patient’s leg and arm as a function of whole body mass, ranging from slim to morbidly obese body type. Weights are presented both in pounds (lbs.) and metric (kg.) units. Maximum lift and hold loads were calculated based on 75th percentile shoulder flexion strength and endurance capability for US adult females, where the maximum weight for a one-handed lift is 11.1 lbs. and a two-handed lift, 22.2lbs.

Table 1. Ergonomic Tool: Lifting and Holding Legs or Arms in an Orthopaedic Setting*

<table>
<thead>
<tr>
<th>Patient Weight</th>
<th>Body Part</th>
<th>Body Part Weight</th>
<th>Lift 1-hand</th>
<th>Lift 2-hand</th>
<th>Hold 2-hand 1 min.</th>
<th>Hold 2-hand 2 min.</th>
<th>Hold 2-hand 3 min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs. (kg.)</td>
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<td>Lbs. (kg.)</td>
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<tr>
<td>&lt;40 lbs.</td>
<td>Leg</td>
<td>&lt;6.3 lbs. (3 kg.)</td>
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<tr>
<td>(&lt;18 kg.)</td>
<td>Arm</td>
<td>&lt;2.0 lbs. (1 kg.)</td>
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<tr>
<td>40-90 lbs.</td>
<td>Leg</td>
<td>&lt;14.1 lbs. (6 kg.)</td>
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<tr>
<td>(18-41 kg.)</td>
<td>Arm</td>
<td>&lt;4.6 lbs. (2 kg.)</td>
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<tr>
<td>90-140 lbs.</td>
<td>Leg</td>
<td>&lt;22.0 lbs. (10 kg.)</td>
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<tr>
<td>(41-64 kg.)</td>
<td>Arm</td>
<td>&lt;7.1 lbs. (3 kg.)</td>
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<tr>
<td>140-190 lbs.</td>
<td>Leg</td>
<td>&lt;29.8 lbs. (14 kg.)</td>
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<tr>
<td>(64-86 kg.)</td>
<td>Arm</td>
<td>&lt;9.7 lbs. (4 kg.)</td>
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<tr>
<td>190-240 lbs.</td>
<td>Leg</td>
<td>&lt;37.7 lbs. (17 kg.)</td>
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<tr>
<td>(86-109 kg.)</td>
<td>Arm</td>
<td>&lt;12.2 lbs. (6 kg.)</td>
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<tr>
<td>240-290 lbs.</td>
<td>Leg</td>
<td>&lt;45.5 lbs. (21 kg.)</td>
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<tr>
<td>(109-132 kg.)</td>
<td>Arm</td>
<td>&lt;14.8 lbs. (7 kg.)</td>
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<tr>
<td>290-340 lbs.</td>
<td>Leg</td>
<td>&lt;53.4 lbs. (24 kg.)</td>
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<tr>
<td>(132-155 kg.)</td>
<td>Arm</td>
<td>&lt;17.3 lbs. (8 kg.)</td>
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<tr>
<td>340-390 lbs.</td>
<td>Leg</td>
<td>&lt;61.2 lbs. (28 kg.)</td>
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<tr>
<td>(155-177 kg.)</td>
<td>Arm</td>
<td>&lt;19.9 lbs. (9 kg.)</td>
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<tr>
<td>390-440 lbs.</td>
<td>Leg</td>
<td>&lt;69.1 lbs. (31 kg.)</td>
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<tr>
<td>(177-200 kg.)</td>
<td>Arm</td>
<td>&lt;22.2 lbs. (10 kg.)</td>
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</tr>
<tr>
<td>&gt; 440 lbs.</td>
<td>Leg</td>
<td>&gt;69.1 lbs. (31 kg.)</td>
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<td></td>
</tr>
<tr>
<td>(&gt;200 kg.)</td>
<td>Arm</td>
<td>&gt;22.2 lbs. (10 kg.)</td>
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</tr>
</tbody>
</table>

* No shading: Lift and hold is appropriate but use clinical judgment and do not hold longer than noted.

Heavy shading: Do not lift alone; use assistive device or more than one caregiver.

The shaded areas of the table indicate whether it would be acceptable for one caregiver to lift the listed body parts with one or two hands or hold the respective body parts for 1, 2, or 3 minutes with two hands. Respecting these limits will minimize risk of muscle fatigue and the potential for musculoskeletal disorders. If the limb weight exceeds the values listed in the table it is recommended to use assistive technology, such as a ceiling lift or floor based lift with a limb support sling. Orthopaedic caregivers must use clinical judgment to assess the need for additional staff member assistance or assistive devices to lift and/or hold one of these body parts for a particular period of time.
**Note:** It is important to remember that the chart shows the acceptable weights for limbs without a cast in place. If the caregiver is lifting a limb with a cast, the additional weight of the cast should be added to the weight of the limb to determine whether the lift is acceptable. An alternate method is provided below for limbs with casts. These are guidelines for the average weight of the leg and arm, and are based upon the patient’s weight. The maximum weight for a 1-handed lift is 11.1 lbs. and a 2-handed lift, 22.2 lbs.

Patient weight is divided into weight categories (see Table 1), ranging from very light to morbidly obese. Normalized weight for each leg and each arm are calculated as a percentage of body weight where each complete arm weighs 5.1% of total body mass and each leg weighs 15.7% of total body mass (Chaffin, Anderson, & Martin, 1999). All weights are presented in both pounds and kilograms, rounded to the nearest whole unit.

To accommodate 75% of the US adult female working population, maximum load for a 1-handed lift is calculated to be 11.1 lbs. (5.0 kg.). This is determined by calculating the strength capabilities for 25th percentile US adult female maximum shoulder flexion movement (the mean equals 40 Newton meters, standard deviation equals 13 Nm) (Chaffin, Anderson, & Martin, 1999) and 75th percentile US adult female shoulder to grip length (the mean equals 610 mm, the standard deviation equals 30 mm) (Pheasant, 1992). Maximum loads for one person for a 2-handed lift (i.e., 22.2 lbs. /10.1 kg.) are calculated as twice that of a 1-handed lift. Muscle strength capabilities diminish as a function of time, therefore, maximum loads for 2-handed holding of body parts are presented for 1, 2, and 3 minute durations. After 1 minute, muscle endurance has decreased by 48%, decreased by 65% after 2 minutes, and, after 3 minutes of continuous holding, strength capability is only 29% of initial lifting strength (Rohmert, 1973, a, b). If the limits in ergonomic Table 1 are exceeded, additional staff members or assistive limb holders should be used.

**References**
Orthopaedic Clinical Tool #2: Alternate Method for Determining Safe Lifting and Holding of Limbs with Casts

Table 2.1. Predicted Weight for Different Types of Casts

<table>
<thead>
<tr>
<th>Limb</th>
<th>Limb Weight Factor</th>
<th>1-hand</th>
<th>2-hands</th>
<th>2-hands 1 min.</th>
<th>2-hands 2 min.</th>
<th>2-hands 3 min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leg</td>
<td>0.157</td>
<td>11.1 lbs.</td>
<td>22.2 lbs.</td>
<td>11.6 lbs.</td>
<td>7.8 lbs.</td>
<td>6.4 lbs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.1 kg.)</td>
<td>(10.2 kg.)</td>
<td>(5.3 kg.)</td>
<td>(3.5 kg.)</td>
<td>(2.9 kg.)</td>
</tr>
<tr>
<td>Arm</td>
<td>0.051</td>
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</tbody>
</table>

Multiply the patients’ weight times the limb factor (0.157 for leg and 0.051 for arm) and add the weight of the cast. Compare the calculated weight to the value in the appropriate task box. If the total limb weight exceeds the weight in the appropriate box, then the caregiver should not manually lift the limb alone, but should use an assistive device or more than one caregiver to perform the lift. On the other hand, if the calculated weight is less than the value in the appropriate box, then it is acceptable to manually lift and hold the limb and the caregiver should use clinical judgment and not hold longer than noted.

For example if the patient weighs 200 lbs. and has an arm cast weighing 5 lbs., then the total arm weight would be 200 lbs. x 0.051 plus 5 lbs., or 15.2 lbs. In this case, the arm should not be lifted with one hand (i.e., 15.2 lbs. > 11.1 lbs.) but could be lifted with two hands (i.e., 15.2 lbs. < 22.2 lbs.), but not held in that position less than a few seconds (15.2 lbs. > 11.6 lbs.). Similarly, if the patient weighs 75 lbs. and has a 5 lb. leg cast, then the total limb weight would be 75 lbs. x 0.157 plus 5 lbs., or 16.8 lbs. In this case, it would not be acceptable to lift the limb with one hand (i.e., 16.8 lbs. > 11.1 lbs.), but it would be acceptable to lift it with two hands (i.e., 16.8 lbs. < 22.1 lbs.), but should not be held more than a few seconds (16.8 lbs. > 11.6 lbs.).

Table 2.2. Predicted Weights for a Fiberglass Cast

The following Table 2.2 provides some predicted weights for a fiberglass cast.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>0.5 lbs.</td>
<td>1 lbs.</td>
<td>2 lbs.</td>
<td>3.0 lbs.</td>
<td>2 lbs.</td>
<td>4 lbs.</td>
</tr>
<tr>
<td>2 rolls 3”</td>
<td>1 roll 2”</td>
<td>4 rolls 4”</td>
<td>3 rolls 3”</td>
<td>2 rolls 2”</td>
<td>5 rolls 3”</td>
</tr>
<tr>
<td>+ webril*</td>
<td>+ webril*</td>
<td>+ webril*</td>
<td>+ webril*</td>
<td>+ webril*</td>
<td>+ webril*</td>
</tr>
</tbody>
</table>

*Weight of webril is 0.25 lb. per packet
Notes to Algorithms and Clinical Tools for Safe Patient Handling in an Orthopaedic Setting: Helpful Hints

Selection of the appropriate sling accessory for movement / lift /transfer, must include the following considerations:

- Decision to transfer pt. in sitting vs. supine position – choose correct functionality of the sling
- Select appropriate size
- Maintain alignment of the affected body part(s) according to pre-op/ post-op guidelines
  - Consider the patient’s body size, shape and features (e.g. very Large abdominal girth can limit degree of hip flexion)
  - Features of sling –
    - consider where material covers patient.
    - strap options for seated slings-the length of material for strap supports of the lower extremities can often be modified by selecting differing loop attachment points of the sling onto the hanger bar ( e.g. providing more material length will allow lower extremity to be in less flexed position)
    - seated slings back height can vary from supporting whole trunk and head to covering pelvis/waist only. When upper extremities are involved, consider height of the sling – high back slings will wrap around and enclose an upper extremity, while a low back sling will allow upper extremity to be free
- If alignment / positioning guidelines can not be met with sling accessory available, transfer pt in supine with sheet style sling or anti-friction methods, then sit upright
- The “Patient Care Sling Selection and Usage Toolkit” is available for download at: http://www.visn8.va.gov/patientsafetycenter/safePtHandling/toolkitSlings.asp
Ergonomic Tool #1. Lateral Transfer from Stretcher to and from the Operating Table
September 28, 2006

- One of the caregivers may be the anesthesia provider
- The number of personnel to safely transfer the patient should be adequate to maintain the patient's body alignment, support extremities and maintain patient's airway.
- For lateral transfers it is important to use a lateral transfer device that extends the length of the patient.
- Current technologies for supine to prone include: Jackson Frame, Spine Table, etc.
- Destination surface should be slightly lower for all lateral patient moves.
- A separate algorithm for prone to jackknife is not included as this is assumed to be a function of the table.
- If patient's condition will not tolerate a lateral transfer, consider the use of a mechanical lift with a supine sling.
- During any patient transferring task, if any caregiver is required to lift more than 35 lbs. of a patient's weight, assistive devices should be used for the transfer.
- While some facilities may attempt to perform a lateral transfer simultaneously with positioning the patient in a lateral position (side-lying), this is not recommended until new technology is available.
- The assumption is that the patient will leave the operating room in the supine position.
Ergonomic Tool #2. Positioning/Repositioning the Patient on the OR Table to and from the Supine Position
November 17, 2006

What is the surgical position?

To/From semi-Fowler using beach chair device
See (1) below

Is the patient < 68 lbs?
Yes → Manual lifting or lowering of torso (min. 3 caregivers)
See (3) below
No → Use assistive technology (min. 3 caregivers)
See (1 and 2) below

Proceed with procedure

To/From Lateral

Is the patient < 115 lbs? *
Yes → Manual positioning approved (min. 4 caregivers)
See (3) below
No → Use assistive technology (min. 3 caregivers)
See (1) below
Proceed with procedure

Is the patient < 141 lbs?
Yes → Manual 2-handed lift of legs (min. 2 caregivers [1 each leg]) or use assistive technology
See (1) below
No → Use assistive technology or (min. 4 caregivers)
See (1) below
Proceed with procedure

Is the patient < 68 lbs?

No

To/From Lithotomy

Is the patient < 115 lbs? *

No

Note: < means less than; > means greater than

(1) Mechanical devices are preferable for this task, but their practicality has not yet been tested. There are special slings and straps that can be used with mechanical devices. For example, turning straps can be used to turn a patient to and from lateral or supine, or limb support slings can be used to lift the legs to and from lithotomy. More research is needed.
(2) Use the automatic semi-fowler positioning feature of your electric table if available.
(3) One of these caregivers could be the anesthesia provider to hold the head and maintain the airway.

* Note: This differs from Algorithm 1 (157) lbs because a 4th caregiver is involved.
* During any patient handling task, if any caregiver is required to lift more than 35 lbs. of a patient's weight, an assistive device should be used.
* The number of personnel to safely position the patient should always be adequate to maintain the patient's body alignment.
* A separate algorithm for prone to jackknife if not included as this is assumed to be a function of the table.
### Ergonomic Tool #3: Lifting and Holding Legs, Arms, and Heads for Prepping in a Perioperative Setting

**Key**
- **No shading**: OK to lift and hold, use clinical judgment, do not hold longer than noted.
- **Heavy shading**: Do not lift alone, use assistive device or more than one caregiver.

<table>
<thead>
<tr>
<th>Patient Weight</th>
<th>Body Part</th>
<th>Body Part Weight</th>
<th>Lift 1-hand</th>
<th>Lift 2-hand</th>
<th>Hold 2-hand</th>
<th>Hold 2-hand</th>
<th>Hold 2-hand</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs (kg)</td>
<td></td>
<td>lbs (kg)</td>
<td></td>
<td></td>
<td>&lt;1 min</td>
<td>&lt;2 min</td>
<td>&lt;3 min</td>
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<tr>
<td>&lt;120 lbs (≤ 54 kg)</td>
<td>Leg</td>
<td>&lt;19 lbs (9 kg)</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td>Arm</td>
<td>&lt;6 lbs (3 kg)</td>
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<tr>
<td></td>
<td>Head</td>
<td>&lt;10 lbs (5 kg)</td>
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<tr>
<td>120-160 lbs (54-73 kg)</td>
<td>Leg</td>
<td>&lt;25 lbs (11 kg)</td>
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<td></td>
<td>Arm</td>
<td>&lt;8 lbs (4 kg)</td>
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<td></td>
<td>Head</td>
<td>&lt;13 lbs (6 kg)</td>
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<tr>
<td>160-200 lbs (73-91 kg)</td>
<td>Leg</td>
<td>&lt;31 lbs (14 kg)</td>
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<tr>
<td></td>
<td>Arm</td>
<td>&lt;10 lbs (5 kg)</td>
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<tr>
<td></td>
<td>Head</td>
<td>&lt;17 lbs (8 kg)</td>
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<tr>
<td>200-240 lbs (91-109 kg)</td>
<td>Leg</td>
<td>&lt;38 lbs (17 kg)</td>
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<td></td>
<td>Arm</td>
<td>&lt;12 lbs (6 kg)</td>
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<td></td>
<td>Head</td>
<td>&lt;20 lbs (9 kg)</td>
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<tr>
<td>240-280 lbs (109-127 kg)</td>
<td>Leg</td>
<td>&lt;44 lbs (20 kg)</td>
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<td></td>
<td>Arm</td>
<td>&lt;14 lbs (6 kg)</td>
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<tr>
<td></td>
<td>Head</td>
<td>&lt;24 lbs (11 kg)</td>
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<tr>
<td>280-320 lbs (127-145 kg)</td>
<td>Leg</td>
<td>&lt;50 lbs (23 kg)</td>
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<td></td>
<td>Arm</td>
<td>&lt;16 lbs (7 kg)</td>
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<td></td>
<td>Head</td>
<td>&lt;27 lbs (12 kg)</td>
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<tr>
<td>&gt;360 lbs (&gt;163 kg)</td>
<td>Leg</td>
<td>&gt;57 lbs (26 kg)</td>
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<td></td>
<td>Arm</td>
<td>&gt;18 lbs (8 kg)</td>
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<td></td>
<td>Head</td>
<td>&gt;30 lbs (14 kg)</td>
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</tbody>
</table>
Ergonomic Tool #4. Prolonged Standing
November 14, 2006

Start

Does caregiver stand in the same position more than 2 hours continuously or more than 30% of the work day?

No

Does procedure require the use of lead aprons?

No intervention required

Yes

Use fatigue-reducing technique (eg alternate propping one foot on foot stool, anti-fatigue mats, sit/stand stool and supportive footwear)

Yes

Limit to 1 hour, use a portable sit to stand stool or a portable lead shield

GENERAL RECOMMENDATIONS

- Caregivers should wear supportive footwear that has the following properties: does not change the shape of the foot; has enough space to move toes; shock-absorbing cushioned insoles; closed toe; height of heel in proportion to the shoe.
- Caregivers may benefit from wearing support stockings/socks.
- Anti-fatigue mats should be on the floors.
- Anti-fatigue mats should be placed on standing stools
- The sit-stand chair should be set to the correct height before setting the sterile field so they will not be changing levels during the procedure.*
- Be aware of infection control issues for non-disposable and anti-fatigue matting.
- The 2-hour limit on prolonged standing incorporates accommodations for pregnancy.
- Scrubbed staff should not work with the neck flexed more than 30 degrees or rotated for more than one minute uninterrupted.
- 2-piece lightweight lead aprons are recommended.
- During the sit-to-stand break, staff should look straight ahead for a short while.

Ergonomic Tool #5: Retraction (last updated Nov. 17, 2006)

- Assistant should be at an optimal working height/posture for manual retraction.*
- Hold retractor as close to body as possible and maintain a good posture.

Can a self-retaining retractor be safely used for the task?

- Use self-retaining retractor.

Is manual retraction also necessary?

- Assistant should be at an optimal working height/posture for manual retraction.*
- Hold retractor as close to body as possible and maintain a good posture.

* Optimal working height is defined as area between the chest and the waist height to operative field. Optimal posture is defined as perpendicular/straight-on to the operative field; asymmetrical posture may be acceptable depending on load and duration; torso twisting should be avoided at all times.
- Arm rests should be used as possible, and be large enough to allow repositioning of the arms.
- Under optimal working height and posture, an assistive device should be used to lift or hold more than 35 lbs.
- Further research is needed to determine time limits for exposure. This is a high risk task, therefore, team members should take rest breaks or reposition when possible.
- Avoid using the hands as an approach to retraction, it is very high risk for musculoskeletal or sharps injuries.
# Lifting and Carrying Supplies and Equipment

<table>
<thead>
<tr>
<th>Lifting Task</th>
<th>Lifting Index</th>
<th>Level of Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,000 ml irrigation fluid</td>
<td>&lt;0.2</td>
<td>Minimal risk – Safe to lift</td>
</tr>
<tr>
<td>Sand bags</td>
<td>0.3</td>
<td>Light shading – Potential risk – Use assistive technology, as available</td>
</tr>
<tr>
<td>Linen bags</td>
<td>0.4</td>
<td>Light shading – Potential risk – Use assistive technology, as available</td>
</tr>
<tr>
<td>Lead aprons</td>
<td>0.4</td>
<td>Light shading – Potential risk – Use assistive technology, as available</td>
</tr>
<tr>
<td>Custom sterile packs (eg, heart or spine)</td>
<td>0.5</td>
<td>Light shading – Potential risk – Use assistive technology, as available</td>
</tr>
<tr>
<td>Garbage bags (full)</td>
<td>0.7</td>
<td>Light shading – Potential risk – Use assistive technology, as available</td>
</tr>
<tr>
<td>Positioning devices off shelf or rack (eg, stirrups)</td>
<td>0.7</td>
<td>Light shading – Potential risk – Use assistive technology, as available</td>
</tr>
<tr>
<td>Positioning devices off shelf or rack (eg, gel pads)</td>
<td>0.9</td>
<td>Heavy shading – Considerable risk – one person should not perform alone or weight should be reduced</td>
</tr>
<tr>
<td>Hand table (49” x 28”)-largest hand table-used infrequently</td>
<td>1.2</td>
<td>Heavy shading – Considerable risk – one person should not perform alone or weight should be reduced</td>
</tr>
<tr>
<td>Fluoroscopy Board (49” x 21”)</td>
<td>1.2</td>
<td>Heavy shading – Considerable risk – one person should not perform alone or weight should be reduced</td>
</tr>
<tr>
<td>Stirrups (2- one in each hand)</td>
<td>1.4</td>
<td>Heavy shading – Considerable risk – one person should not perform alone or weight should be reduced</td>
</tr>
<tr>
<td>Wilson frame</td>
<td>1.4</td>
<td>Heavy shading – Considerable risk – one person should not perform alone or weight should be reduced</td>
</tr>
<tr>
<td>Irrigation containers for lithotripsy (12,000 ml)</td>
<td>1.5</td>
<td>Heavy shading – Considerable risk – one person should not perform alone or weight should be reduced</td>
</tr>
<tr>
<td>Instrument pans</td>
<td>2.0</td>
<td>Heavy shading – Considerable risk – one person should not perform alone or weight should be reduced</td>
</tr>
</tbody>
</table>

**Key**

- **No shading** - Minimal risk – Safe to lift
- **Light shading** - Potential risk – Use assistive technology, as available
- **Heavy shading** - Considerable risk – one person should not perform alone or weight should be reduced.

Note: Assistive devices include adjustable-height lift tables, rolling carts, two-wheeled carts, dollies, or mechanical transport devices.
## Pushing, Pulling, and Moving Equipment on Wheels

<table>
<thead>
<tr>
<th>OR Equipment</th>
<th>Pushing Force lbF (kgF)</th>
<th>Max Push Distance ft / (m)</th>
<th>Ergonomic Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrosurgery unit</td>
<td>8.4 lbF (3.8 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>Ultrasound</td>
<td>12.4 lbF (5.6 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>X ray equipment portable</td>
<td>12.9 lbF (5.9 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>Video towers</td>
<td>14.1 lbF (6.4 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>Linen cart</td>
<td>16.3 lbF (7.4 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>X ray equip – C-arm</td>
<td>19.6 lbF (8.9 kgF)</td>
<td>&gt;200ft (60m)</td>
<td>Task is acceptable for 1 caregiver</td>
</tr>
<tr>
<td>Case carts – empty</td>
<td>24.2 lbF (11.0 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>OR stretcher unoccupied</td>
<td>25.1 lbF (11.4 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>Case carts – full</td>
<td>26.6 lbF (12.1 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>Microscopes</td>
<td>27.5 lbF (12.5 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>Hospital bed – unoccupied</td>
<td>29.8 lbF (13.5 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>Specialty equip carts</td>
<td>39.3 lbF (17.9 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>OR stretcher - occupied 300 lbs</td>
<td>43.8 lbF (19.9 kgF)</td>
<td>&gt;200ft (60m)</td>
<td></td>
</tr>
<tr>
<td>Bed - occupied 300 lbs</td>
<td>50.0 lbF (22.7 kgF)</td>
<td>&lt;200ft (30m)</td>
<td>Min 2 caregivers required</td>
</tr>
<tr>
<td>Specialty OR beds unoccupied</td>
<td>69.7 lbF (31.7 kgF)</td>
<td>&lt;100ft (30m)</td>
<td></td>
</tr>
<tr>
<td>OR bed unoccupied</td>
<td>61.3 lbF (27.9 kgF)</td>
<td>&lt;25ft (7.5m)</td>
<td>Recommend powered transport device</td>
</tr>
<tr>
<td>OR bed occupied 300 lbs</td>
<td>112.4 lbF (51.1 kgF)</td>
<td>&lt;25ft (7.5 m)</td>
<td></td>
</tr>
<tr>
<td>Specialty OR beds - occupied 300 lbs</td>
<td>124.2 lbF (56.5 kg)</td>
<td>&lt;25ft (7.5 m)</td>
<td></td>
</tr>
</tbody>
</table>

### Key
- **No shading**: Minimal risk - Task is acceptable for 1 caregiver
- **Light shading**: Moderate risk – Minimum of 2 caregivers or powered device recommended
- **Heavy shading**: Considerable risk - Recommend powered transport device