Safe Patient Handling and Movement Series

AORN Ergonomic Tool 1:

Lateral Transfer of a Patient from a Stretcher to an OR Bed

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ABSTRACT

Moving patients can result in injuries to patients and staff members. Lateral patient transfers from a stretcher to an OR bed pose a high risk for musculoskeletal disorders, including lower back, shoulder, and neck injuries for perioperative personnel. AORN Ergonomic Tool 1: Lateral Transfer of a Patient from a Stretcher to an OR Bed helps perioperative staff members determine best practices for safe lateral patient transfers. Safe moving of the patient is determined by the starting and ending position required and the patient's weight. Current ergonomic safety concepts and scientific evidence regarding weight limits help to determine how many caregivers are needed to safely move patients and whether mechanical assistance is needed during lateral transfers. *AORN J* 93 (March 2011) 334-339. Published by Elsevier Inc. on behalf of AORN, Inc. doi: 10.1016/j.aorn.2010.08.025

Key words: *ergonomics, musculoskeletal disorders, back injuries, patient transfers, lateral transfer, perioperative patient safety, perioperative personnel safety, work-related injuries.*

Editor's note: *This is the first in a series of seven articles based on the "AORN guidance statement: Safe patient handling and movement in the perioperative setting." These articles describe specific ergonomic solutions for high-risk patient handling tasks in the perioperative clinical setting.*

Moving patients during care can result in injury to the patient or the staff members involved. Lateral patient transfers and positioning in the OR place staff members at high risk for developing musculoskeletal disorders (MSDs), including lower back, shoulder, and neck injuries.[1] Lateral transfers are the most frequent cause of back and shoulder MSDs in general nursing practice.[2,3] A lateral transfer is defined as movement of a patient horizontally or laterally. In the perioperative setting, lateral transfers are performed many times during a typical work shift, and the frequency of this maneuver significantly increases the risk of work-related

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MSDs. Several factors can contribute to increasing that risk, including

- handling of patients who are obese;
- uneven distribution of the patient's weight (eg, patients with amputated limbs); and
- environmental barriers that force the nurse into awkward positions during transfers (eg, reaching across the OR bed to receive the patient).[4]

The patient's condition, such as the need to maintain the patient's airway or body alignment or the need to support the patient's extremities, also may add complexity to the task.

The goal of a lateral transfer may be to move the patient across a surface while maintaining his or her supine position or to move the patient from a supine to a prone position. Two or more caregivers typically perform a lateral transfer by a combination of lifting, pushing, and pulling toward the transfer site destination. At either the start or the end of the task, nursing personnel must reach over one surface (eg, a stretcher) to another (eg, an OR bed) with extended arms (Figure 1). The risks associated with this maneuver include excessive reach and high pushing or pulling forces. These risks are exacerbated when there are differences in height among team members performing the transfer or when the patient is uncooperative because of confusion or other issues (eg, paralysis, guarding of a surgical wound). Ergonomic Tool 1: Lateral Transfer of a Patient from a Stretcher to an OR Bed is a scientifically based algorithm to assist the perioperative RN and other team members in laterally transferring a patient from a stretcher to an OR bed in a manner that is safe for both the patient and team members (Figure 2).

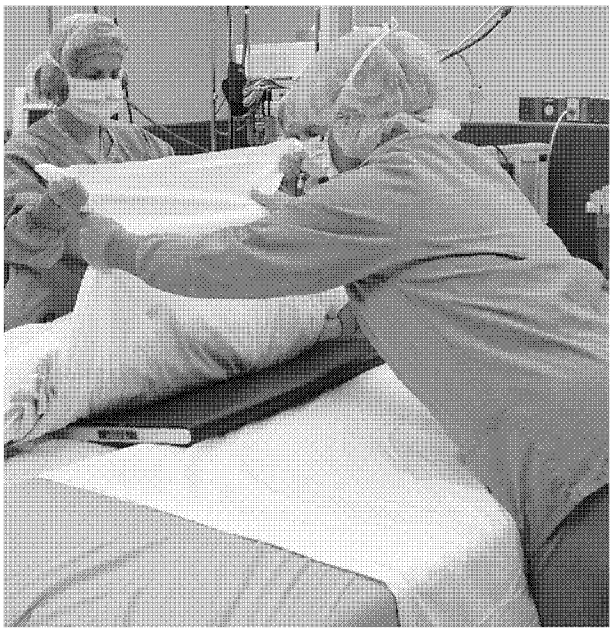

Figure 1. Excessive reach is often required during lateral transfer of a patient.

ERGONOMIC TOOL 1

Transferring a patient from the stretcher to the OR bed often is one of the first actions the perioperative team performs. Commonly, the patient is anesthetized in the supine position on the transport cart and then laterally transferred to the OR bed in either the supine or prone position, depending on the planned surgical procedure. If the patient cannot move from the stretcher to the OR bed without assistance or is anesthetized, then the user follows either the left or right pathway of the tool, depending on whether the patient is starting in a prone or supine position. The number of personnel required to safely transfer a patient should always be sufficient to maintain the patient's body alignment as well as protect caregivers from injury. Multiple patient safety factors must be considered as well as the safety of the caregiver during a patient transfer.

Supine-to-Prone Position

If the patient's starting position is supine but the goal is to place the patient in a prone position, then the recommendation for a lateral transfer in a prone position is suggested (ie, the left-hand side of the algorithm). Typically, this task is performed manually by three or four caregivers. One of the caregivers generally is the anesthesia care provider, who is responsible for maintaining the airway and for lifting and supporting the patient's head during the supine-to-prone transfer. Often during supine-to-prone lateral transfers, one member

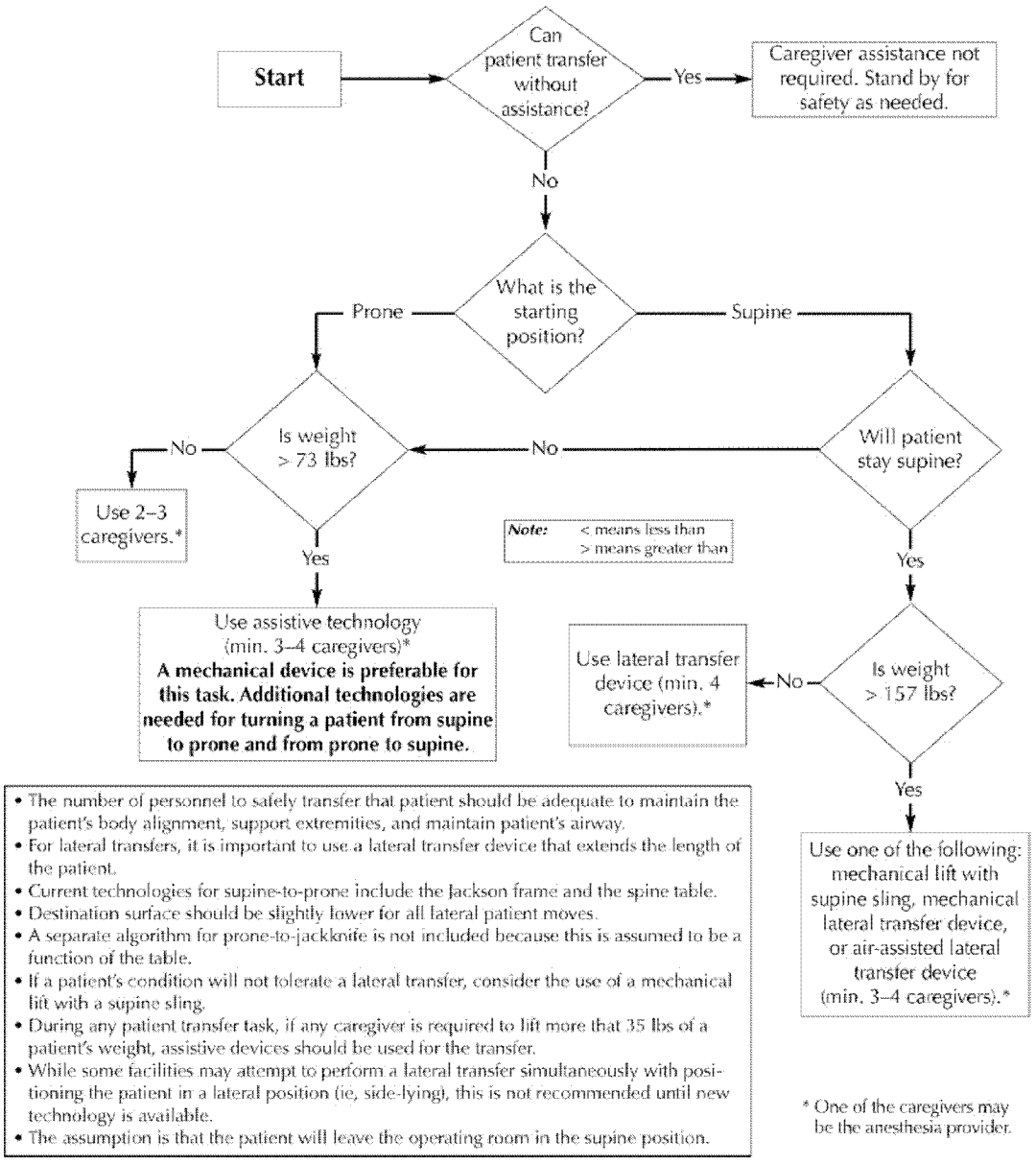

Figure 2. Ergonomic Tool 1: Lateral Transfer of a Patient from a Stretcher to an OR Bed.

of the transfer team stands on the opposite side of the OR bed with his or her arms extended, and the other members of the team lift and roll the patient onto the caregiver's outstretched arms until positioning supports stabilize the patient in the prone position. This practice places great stress on the caregiver who must support the patient's body weight while positioning is completed.

The goal for recommendations in AORN's lateral transfer tool was to determine a maximum two-handed load-lifting value acceptable to 75% of the adult female population in the United States (ie, 11.1 lb [5.0 kg] for a one-handed lift and 22.2 lb [10.1 kg] for a two-handed lift).[2] On the basis of this goal, each caregiver should not be expected to lift more than 22.2 lb of the patient's body mass during a transfer. The patient's head and neck, which is normally held by the anesthesia care provider, comprises approximately 8.4% of total body mass. During the supine-to-prone transfer, caregivers responsible for the patient's body must therefore lift the remaining 91.6% of total body mass.[5]

- Two caregivers and an anesthesia care provider should be able to safely transfer a patient weighing up to 48.5 lb (22.0 kg) from a supine-to-prone position (22.2 lb multiplied by 2 divided by 0.916).
- Three caregivers and an anesthesia care provider should be able to safely transfer a patient weighing up to 73 lb (33.0 kg) from a supine-to-prone position (22.2 lb multiplied by 3 divided by 0.916).
- If the patient's weight is greater than 73 lb, then assistive technology should be used and three or four caregivers should perform the transfer.

Although use of a mechanical device is recommended, equipment specifically designed for this task has only recently been made available commercially. Equipment vendors should be encouraged to develop additional mechanical devices to provide a range of technologies specifically targeted to lateral transfers in the perioperative setting.

Supine-to-Supine Transfer

Often, when the patient is being transferred laterally and will remain in the supine position after the transfer (ie, the right-hand side of the algorithm), the task is performed manually by two or three caregivers and an anesthesia care provider with use of a draw sheet. Previous research has shown that when the patient is transferred laterally with just a draw sheet, care providers must exert a pull force up to 72.6% of the patient's weight.[6] Additional research indicates that the maximum sustained pulling force limits recommended for 75% of women under the conditions defined for this task is 35 lb (16 kg). This limit is based on the following assumptions:

- the pulling distance is 6.9 ft (2.1 m) or less;
- the pull point, or starting point for the hands, is between the caregiver's waist and nipple line; and
- the task is performed no more frequently than once every 30 minutes.[7]

Based on this information, the maximum amount of patient weight that a single caregiver can safely pull is 48 lb (21.8 kg) (ie, the maximum 35-lb pull-force design limit divided by the 72.6% draw sheet force-to-weight ratio). The following guidelines should be taken into consideration when moving a patient:

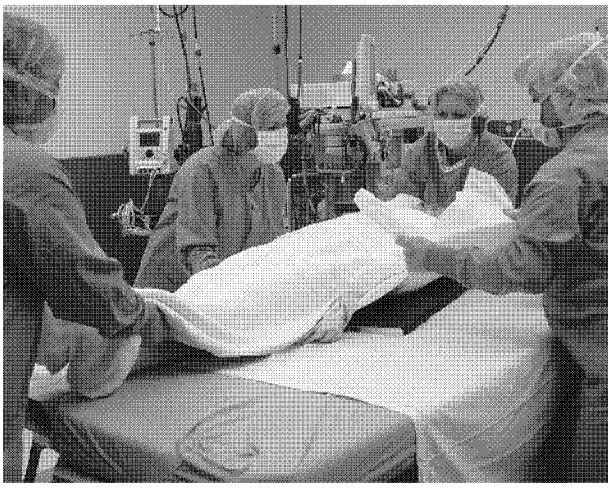

Figure 3. Use of a roller board lateral transfer device for supine-to-supine transfer of a patient.

- The amount of patient weight that can be pulled laterally by one caregiver and an anesthesia care provider equals 52.6 lb (23.9 kg) (48 lb divided by 0.916).
- The maximum patient weight that can be pulled by two caregivers and an anesthesia care provider equals 104.8 lb (47.6 kg) (48 lb multiplied by 2 divided by 0.916).
- For three caregivers and an anesthesia care provider, the maximum patient weight that can safely be pulled is 157.2 lb (71.4 kg) (48 lb multiplied by 3 divided by 0.916).
- Use of a mechanical lifting device (eg, a powered lift with supine sling, mechanical lateral transfer device, air-assisted lateral transfer device) and a minimum of three to four caregivers is recommended if the patient weight is greater than 157 lb.

For a supine-to-supine transfer, AORN recommends that "a lateral transfer device (eg, a friction-reducing sheet, slider board [Figure 3], or air-assisted transfer device [Figure 4]) be used for a lateral patient transfer."[1(p677)]

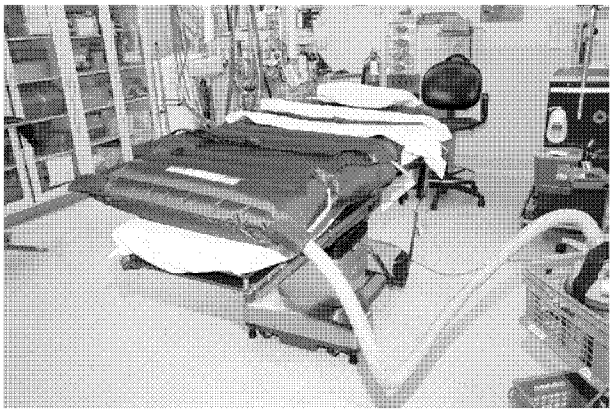

Figure 4. An air-assisted transfer device can be used to aid lateral patient transfers. ***Photograph courtesy of Geraldine Bennicoff, RN, CNOR.***

- If the transfer begins and ends with the patient in the supine position and the patient weighs 157 lb or less, then a friction-reducing or assistive device is required, with a minimum of four caregivers needed to perform the task.
- If the transfer begins and ends with the patient in the supine position and the patient weighs more than 157 lb, then a mechanical lift with a supine sling, a mechanical lateral transfer device, or an air-assisted lateral transfer device and three or four caregivers is recommended to complete the move.

Further information about lateral transfer devices can be found in an article by Baptiste et al.[8]

Prone Position

If the patient weighs 73 lb (32.2 kg) or less and is moved into or from the prone position, then two or three caregivers may perform the task manually. If the patient weighs more than 73 lb, however, then at least three or four caregivers are needed for the transfer, and a mechanical transfer-assist device should be used.

Prone-to-Jackknife

A separate algorithm for prone-to-jackknife transfer is not included in this algorithm because the jackknife position is assumed to be a function of the OR bed. If it is not, then a protocol should be established to ensure that no single caregiver is required to lift more than 35 lb of total weight.

CLINICAL CONSIDERATIONS

Lateral transfers entail special clinical considerations. It is important to use a lateral transfer device that extends the length of the patient and provides full body support necessary to maintain proper alignment of the patient during transfer. New tools for transferring and positioning are always being developed, so users should be alert for new technology and new equipment.

If the patient's condition will not allow a lateral transfer or if there is any doubt about this, then a mechanical lift with a supine sling should be used. In many cases, it may be better to use a mechanical lift to ensure that the patient is not adversely affected by the transfer. If any caregiver will be required to lift more than 35 lb of the patient's weight during transfer, then assistive equipment should be used. According to Waters,[9] no caregiver should lift more than 35 lb of a patient's weight under ideal conditions, and the weight limit should be lower if the caregiver's arms are fully outstretched or the lift occurs near the floor, if the caregiver's arms are above midchest height, or while the caregiver is in a twisted posture.

Although medical personnel at some facilities may attempt to perform a lateral transfer while simultaneously positioning the patient on his or her side, this is not recommended until new technology is available to assist with the transfer. These positioning tasks require complex biomechanical motions that could severely strain the caregiver's back muscles, resulting in a significantly increased risk of back injury during manual transfers. Most patients leave the OR in a supine position, so the lateral transfer task often must be performed twice: once to transfer the patient onto the OR bed and again to move the patient from the OR bed onto a stretcher or transfer bed after surgery. The algorithm applies for both transfers.

CONCLUSION

Lateral transfer of a surgical patient from a stretcher to an OR bed is a frequently performed task that presents risk factors for development of MSDs, particularly lower back and shoulder injuries. The extended reaches and high handling forces required create excessive muscle exertion that can generate high loads on the soft tissues of the caregiver's spine and shoulder joints. These forces are large enough to damage musculoskeletal tissues, which could result in severe lower back or shoulder pain and could lead to permanent disability. It is important, therefore, to determine which tasks may be safe to perform manually with an adequate number of caregivers versus those that should be performed with the use of technology, such as patient transfer devices or other ergonomic equipment. The AORN Ergonomic Tool 1 for assessing lateral patient transfers provides a user-friendly guideline for making such a determination. As with all ergonomic tools, however, professional experience should play a role in decisions about their use. AORN

Editor's note: *The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the National Institute for Occupational Safety and Health or the Veterans Health Administration.*

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