

Patient Positioning (Critical Care Patients): Prone

What Is Prone Positioning for Critical Care Patients?

- › The prone position is defined as lying in a horizontal position with the front of the body facing downward, and is distinguished from pronation (i.e., rotation of the forearm such that the palm of the hand is facing downward). The prone position is the opposite of the supine position, which is defined as laying in a horizontal position facing upward with the back of the head, spinal column, and heels resting directly on a supporting surface. (For information on supine positioning of critical care patients, see *Nursing Practice & Skill ... Patient Positioning (Critical Care Patients): Supine*) **(Figure 1)**

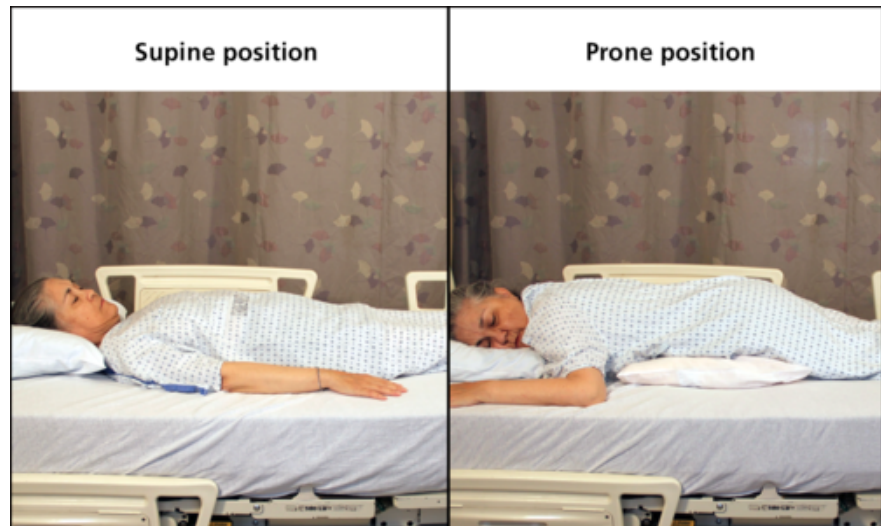


Figure 1: Illustration of patient in the supine and prone positions. Copyright© 2014, EBSCO Information Services.

- **What:** Prone positioning of critically ill patients with respiratory compromise is known to improve short-term oxygenation and lung compliance. Turning the critical care patient to a prone position is a noninvasive procedure that, if properly performed, utilizes knowledge of anatomy and body mechanics. Positioning the patient may require the assistance of several healthcare workers to avoid problems such as dislodgement of an endotracheal tube (ETT) or other invasive tubes and intravascular lines, especially if the patient has mobility limitations. In addition, a physician's order is generally required to position a critically ill patient in the prone position
- **How:** While maintaining patient safety, one or more caregivers provide partial to complete assistance in moving the patient to a position facing downward. Specialized equipment (e.g., a prone positioner, which is a padded device that is attached to the front of the patient's body prior to initiating prone positioning to provide support and stability when lying face-down) may be used (for details, see *What You Need to Know Before Placing a Critical Care Patient in the Prone Position*, below). (For information on assistive devices that may be used to facilitate repositioning, see *Nursing Practice & Skill ... Transfer of Patient: Use of Assistive Devices*)
- **Where:** Prone positioning of critically ill patients is typically performed in a critical care/intensive care unit (ICU) of an acute care facility

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- *Who*: Prone positioning of critically ill patients is commonly performed by nurses and assistive personnel who have been appropriately trained in correct body mechanics and positioning techniques for this patient population

What Is the Desired Outcome of Prone Positioning for Critical Care Patients?

- › The desired outcome of prone positioning in critically ill patients is to improve lung perfusion and oxygenation in patients who are in the early stages of pneumonia or who have an acute lung injury (ALI) or acute respiratory distress syndrome (ARDS)

Why Is Prone Positioning Important for Critical Care Patients?

- › When alternated with other positions (e.g., supine, lateral), prone positioning can improve oxygenation, promote comfort, and help prevent or heal pressure ulcers (PrUs) by relieving pressure exerted on bony prominences. Prone positioning also has a number of positive effects on gas exchange, such as improved matching of ventilation and blood flow
- › Prone positioning can be used as a component of postural drainage, in which different lung sections are drained of secretions by gravity. (For information, see *Nursing Practice & Skill ... Postural Drainage: Performing* and *Nursing Practice & Skill ... Bed Rest, Prolonged: Preventing Complications -- the Critically Ill*)
- › Prone positioning allows easy patient access when rapid performance of a procedure or treatment to the back of the patient's body is necessary

Facts and Figures

- › The prone position improves gas exchange and reduces mortality in patients with respiratory insufficiency (Sud et al., 2010). However, the results of research studies on the use of ventilation in patients with ARDS placed in the prone position have been mixed; although results indicate improved oxygenation, decreased hypoxemia, and lowered mortality, overall survival benefit may not be improved by prone positioning (Taccone et al., 2009)
- › In a study of 20 critically ill patients with ARDS in an intensive care setting, investigators found that alternating prone positioning with additional prone upright positioning (i.e., prone positioning with the head of the bed elevated and the foot lowered) resulted in marked improvement in gas exchange (Robak et al., 2011)

What You Need to Know Before Placing a Critical Care Patient in the Prone Position

- › Prolonged supine positioning of critically ill patients with respiratory compromise increases susceptibility to compression atelectasis and mechanical ventilation-associated lung damage. Prone positioning is performed in these patients as a therapeutic intervention to improve lung compliance and oxygenation
 - Therapeutic prone positioning typically involves placing the critically ill patient on his/her abdomen for 6 hours or more per day. The frequency and duration of prone positioning is specified in the clinician order for the procedure
- › The patient's weight, medical condition, mobility needs, and complexity of medical treatment (e.g., to avoid dislodgement of indwelling devices) must be considered prior to placing a critically ill patient in the prone position
 - Prone positioning is **contraindicated** in patients
 - who cannot tolerate the position (e.g., as indicated by level of pain or agitation and/or decline in respiratory status)
 - with increased intracranial pressure, spinal instability, shock, abdominal surgery, or abdominal compartment syndrome
 - who are pregnant
 - who are extremely obese (e.g., > 300 lbs)
 - who have pelvic or facial fractures
 - who have burns or wounds on the abdomen
 - who are hemodynamically unstable
 - The development of specialized equipment for prone positioning has contributed to an increase in the use of prone positioning in critical care settings. Prone positioners (e.g., the Vollman Prone Positioner [Hill-Rom]) are cushioned frames that are strapped on the front of the patient's body prior to repositioning, on which the patient lies face-down when prone. The frame slightly elevates the patient's body from the pelvis upward, and is segmented such that a separate padded piece supports the chest, pelvis (just above the ileac crest), forehead, and chin. The space between the forehead and chin pads allows for the presence of an ETT, and the space between the pelvis and chest pads allows for maximal lung expansion when facing down
 - There are adverse effects of prone positioning (for details, see *Red Flags* , below)
- › Levels of assistance necessary to reposition a patient are categorized as independent (i.e., the patient is able to move and perform physical tasks safely without staff assistance or the use of assistive devices), partial assist (i.e., the patient requires

some physical assistance and/or verbal guidance when moving, or stand-by assistance is necessary), and dependent (i.e., the patient is unable to lift more than one third of his/her body weight, is unpredictable in the amount of assistance he/she can provide, and/or requires use of assistive transfer devices)

- Due to the severity of illness/injury, use of sedation and mechanical ventilation, and presence of indwelling devices, critically ill patients are generally classified as dependent and require full assistance when repositioning in bed. As a general rule, at least three staff members should be involved when performing prone positioning of a critically ill patient
- › The clinician should understand the basic principles of standard precautions, including performing hand hygiene before and after patient contact and donning gloves and other personal protective equipment (PPE; e.g., gown, mask, eye protection) as needed to minimize exposure to blood and body fluids
- › Preliminary steps that should be performed before placing the critical care patient in the prone position include the following:
 - Review the facility/unit protocol for positioning of critical care patients, if one is available. Note instructions and guidelines for
 - frequency with which patients should be repositioned
 - use of specialized equipment
 - safe patient handling and use of proper body mechanics
 - number of staff members required for repositioning a patient based on weight, medical condition, and mobility needs
 - Review the treating clinician's orders for patient positioning
 - Verify that a patient-specific order exists for prone positioning; verify the prescribed frequency and duration of prone positioning
 - Note if medication (e.g., analgesia, sedative) should be administered prior to patient positioning
 - Note if specific positioning or skin protective devices should be applied once the patient is in the prone position
 - Review manufacturer instructions for all equipment to be used and verify that the equipment is
 - clean (e.g., if using a prone positioner, verify that it was disinfected after the last patient use)
 - in good working order
 - appropriate based on the patient's weight (e.g., the Vollman prone positioner is appropriate for patients who weigh up to 300 lbs)
 - Review the patient's medical history/medical record for information regarding
 - allergies (e.g., to latex, medication, or other substances); use alternative materials, as appropriate
 - joint or mobility limitations in order to promote safety during repositioning
 - Evaluate the number of staff members required for repositioning a patient based on weight, medical condition, mobility needs, and complexity of medical treatment. As appropriate, ask other members of the multidisciplinary team (e.g., respiratory therapist, physical therapist) for assistance
- › Gather the following supplies:
 - Personal protective equipment (PPE; e.g., nonsterile gloves, gown, mask, eye protection) depending on the patient's known or suspected infectious status and anticipated exposure to body fluids
 - Facility-approved pain assessment tool appropriate for use in critical care patients
 - Prescribed medication (e.g., analgesia, sedation), if applicable, and means for its administration
 - Patient monitoring equipment and additional EKG lead patches, if necessary
 - Positioning devices (e.g., pillows, wedges, foam cushions, gel pads, therapeutic boots, hand rolls), as available and as prescribed
 - Prone positioner, if available
 - Assistive transfer device(s), if needed
 - Footboard (optional)

How to Place a Critical Care Patient in the Prone Position

- › Perform hand hygiene and don nonsterile gloves and other PPE as needed; verify that all assisting personnel do the same
- › Identify the patient according to facility protocol
- › Establish privacy by closing the door to the patient's room and/or drawing the curtain surrounding the patient's bed
- › Introduce yourself and all others who will participate in repositioning to the patient, if conscious, and family member(s), if present; explain your clinical role and assess for knowledge deficits and anxiety about prone positioning
 - Determine if the patient/family requires special considerations regarding communication (e.g., due to illiteracy, language barriers, or deafness); make arrangements to meet these needs if they are present

- Use professional certified medical interpreters, either in person or via phone, when language barriers exist
- Explain the procedure and its purpose; answer questions and provide emotional support as needed
- Request visitors and/or family members to leave the room, if indicated, to promote patient privacy
- › Assess the patient's general health status, including his/her pain level using a facility-approved pain assessment tool; premedicate patient with prescribed sedative and/or analgesia, as appropriate, and allow time for a therapeutic level to be reached before initiating patient repositioning
- › Assess the patient's vital signs, oxygen saturation, and cardiac status (e.g., EKG). Remove EKG leads from the front of the body in preparation for repositioning
- › Secure all equipment that is attached to the bed or to the patient (e.g., oxygen tubing, intravenous lines). Place tubes and lines that extend from the upper body over the patient's right or left shoulder, and place excess tubing at the head of the bed. Place tubes and lines that extend from the lower body in line with the right or left leg; place excess tubing at the foot of the bed. Check that all tubes and invasive lines are of adequate length to allow for the change in the patient's position
 - If chest tubes are present, place the tubing and collection system on the side of the bed that will be closest to the insertion site after the patient is repositioned
- › Disconnect and cap the nasogastric (NG) tube and pause the feeding pump, if these are present
- › If present, suction the ETT; check the position of the ETT (note insertion depth) and check that it is securely fixed to the patient. The respiratory therapist should hold the ETT in place during repositioning
- › Perform other patient care procedures that require access to the front of the patient's body (e.g., eye care, ostomy care), as appropriate
- › Reduce your risk for injury (especially to the back) by positioning the bed at a comfortable working height (e.g., thigh level) and checking that the bed wheels are locked
- › Have one staff member (e.g., yourself) stand on one side of the bed, one on the other side, and one at the head of the bed (e.g., respiratory therapist who will secure the ETT as the patient is turned)
- › Position the head of the bed flat
- › Lower the side rails
- › Remove pillows and other items that would interfere with repositioning the patient
- › Use a transfer assistive device or draw sheet to avoid friction and move the patient to the side of the bed closest to you such that he or she will be positioned in the center of the bed when subsequently placed in the prone position
- › If using a prone positioner, apply it to the front of the patient's body according to manufacturer instructions. If using the Vollman prone positioner, perform the following:
 - Place the straps of the positioner under the patient at the level of the head, chest, and pelvis
 - Place the frame device on top of the patient such that the chest piece is between the clavicle and the 6th rib, the pelvic piece is ~.5 in (1 cm) above the ileac crest, and the forehead and chin pieces support the patient's face
 - Secure the straps on one side of the device and then on the other. Verify that the straps are tightly fastened because loose straps increase risk for skin breakdown due to friction and shear forces
- › Collaborate with the assisting staff members to adjust the remaining steps for repositioning the patient according to his/her mobility limitations and as appropriate if a prone positioner is being used (refer to manufacturer instructions)
- › Perform the following to turn the patient from the supine to the prone position:
 - Align the patient's head and legs with the spine
 - Make sure that there is sufficient length in the EKG wires for reattaching to the leads on the patient's chest after the turning of the patient
 - Raise the arm farthest from you over the patient's head in a "swimmer's position" and gently roll the patient to the side toward the center of the bed
 - Continue to roll the patient until he or she is lying on the abdomen in the prone position in the center of the bed
 - Position the patient's head with the face toward the ventilator, if applicable
- › Perform the following, as appropriate, after the patient is repositioned in the prone position from a supine position:
- › Recheck the ETT or airway and suction if needed
 - Reassess the position and patency of all lines and tubes
 - Reattach all EKG lines to the patient's chest, making sure they are not positioned on pressure points (e.g., position on upper left and right shoulder areas away from bony prominences and on the left lateral side of the chest)
 - Recalibrate all EKG lines and other measurement devices as needed
 - Reassess cardiac rhythm and hemodynamic status
 - Assess the patient's comfort level and the need for sedation or analgesia

- Resume the feeding system, if present
- › Perform the following to turn the patient from the lateral (i.e., side-lying) position to the prone position:
 - Align the patient's head and legs with the spine
 - Make sure that there is sufficient length in the EKG wires attached to the leads on the patient's chest
 - Gently roll the patient toward the center of the bed until he or she is lying in the prone position
 - Position the patient's head with the face toward the ventilator, if applicable
- › Perform the following after the patient is repositioned in the prone position from the lateral position:
- › Recheck the ETT or airway and suction if needed
 - Reassess the position and patency of all lines and tubes
 - Reattach all EKG lines to the patient's chest, making sure they are not positioned on pressure points (e.g., position on upper left and right shoulder areas away from bony prominences and on the left lateral side of the chest)
 - Recalibrate all EKG lines and other measurement devices as needed
 - Reassess cardiac rhythm and hemodynamic status
 - Assess the patient's comfort level and the need for sedation and analgesia
 - Resume the feeding system, if present
- › Perform the following after the patient is repositioned in the prone position from either the supine or lateral position:
 - If a prone positioner was used and the patient is clinically stable, loosen the straps. In accordance with the facility/unit protocol and the treating clinician's orders, keep the straps tightly fastened if it is anticipated that the patient will require rapid supine positioning (e.g., if the patient is clinically unstable and sudden initiation of emergency interventions may be necessary)
 - Reassess vital signs, cardiac rhythm, and hemodynamic status; clinical status should stabilize within 10 minutes of prone positioning as an indication of the patient's response to the procedure
 - Assess the skin on the back of the patient's body (e.g., sacral area) for new or worsening areas of irritation or breakdown
- › Perform the following to correct body alignment, promote patient comfort, and prevent pressure areas that increase risk for development of PrUs:
 - Turn the patient's head to one side, as indicated; if using a prone positioner, move the head piece to different positions frequently (e.g., hourly) to prevent skin breakdown
 - Place the patient's arms in a flexed position with the elbows at or near shoulder level **(Figure 2)**

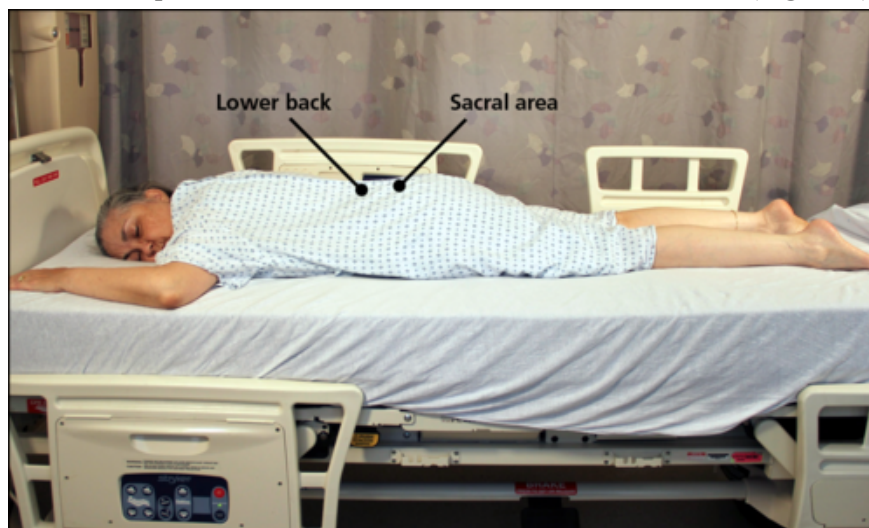


Figure 2: The lumbar and sacral areas of the back are at risk for strain when a patient is placed in the prone position. Use pillows or cushions to properly support these areas. Copyright© 2014, EBSCO Information Services.

- Place hand rolls in the patient's hands to maintain proper positioning of the fingers and thumbs
- Place pillows and/or gel pads under the lower back, knees, and calves to relieve pressure
- Place therapeutic boots on the patient's feet, if prescribed **(Figure 3)**

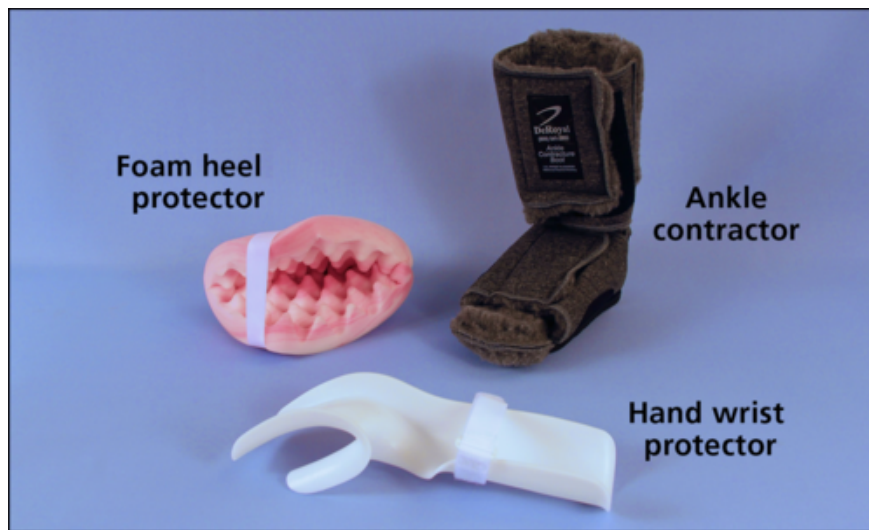


Figure 3: Therapeutic boots, also called ankle contractor boots, are often used to reduce the risk of plantar flexion contractures, hip rotation, and pressure on the heels. Copyright© 2014, EBSCO Information Services.

- Place a footboard or pillow at the foot of the bed to support the patient's feet in a normal flexed position
- Smooth visible wrinkles in the bed linen
- › Raise the side rails and lower the bed for patient safety
- › Reassess the patient's comfort level and place the call light and bedside table within his or her reach
- › Discard PPE and perform hand hygiene
- › Document the following information in the patient's medical record:
 - Date and time of prone positioning
 - Indication for prone positioning
 - Description of the procedure used for patient positioning, including use of assistive transfer devices and/or positioning devices
 - Patient assessment findings such as
 - vital signs
 - respiratory status
 - cardiac status
 - level of pain and if prescribed medication was administered
 - skin assessment findings, including signs of skin breakdown
 - Patient's tolerance of the prone position, including patient report or indications of pain or discomfort
 - Any unexpected patient events, interventions performed, whether or not the treating clinician was notified, and patient outcome
 - All patient/family member education, including topics presented, response to education provided, plan for follow-up education, barriers to communication, and techniques that promoted successful communication

Other Tests, Treatments, or Procedures That May Be Necessary Before or After Placing a Critical Care Patient in the Prone Position

- › Frequent assessment of the patient's oxygenation and hemodynamic status is required, especially immediately following repositioning (for details, see *Red Flags*, below)
- › The patient should be repositioned periodically to avoid the development of complications related to immobility (e.g., PrUs), as ordered by the treating clinician or per facility protocol
- › If the prone position is necessary for a diagnostic procedure or surgery, there will be no complications related to prolonged immobility and the patient will be repositioned for comfort and safety following the diagnostic procedure or surgery

What to Expect After Placing a Critical Care Patient in the Prone Position

- › The patient is comfortable and pressure on bony prominences is minimized or relieved
 - If the patient is able to communicate, he or she will report being comfortable

- If the patient is noncommunicative, vital signs will indicate that the patient is not in distress (e.g., heart rate and respiratory rate will be within baseline limits)
- Airway will remain patent and respiratory effort will be unlabored

Red Flags

- › Do not drag the patient across the surface of the bed because dragging can cause friction and shear to skin and subcutaneous tissues, trigger skin breakdown, and lead to the development of PrUs
- › Prone positioning increases risk for skin breakdown on the face, sternum, hips, and knees and may lead to PrUs. These areas may require additional padding after positioning
- › Facial/eyelid edema can result from prone positioning. Often this is primarily a cosmetic problem that resolves quickly when the patient is returned to the supine or lateral position
- › Potential problems that may occur during or immediately after positioning include the following:
 - Inadvertent removal, manipulation, or kinking of lines and tubes; frequently evaluate and replace or reposition as necessary
 - Deterioration in oxygenation/hemodynamic status, which is usually transient. Monitor for return to baseline vital signs and previous level of blood oxygen saturation. Contact the treating clinician if the patient's status does not stabilize
 - Mobilization of secretions in the airway or ETT. Suction the airway or ETT as required to maintain patency

What Do I Need to Tell the Patient/Patient's Family?

- › Explain the purpose and steps of the procedure for repositioning to the patient and family and respond to any questions or concerns
- › Instruct the patient, if communicative, to alert staff immediately if experiencing discomfort during or after positioning

References

1. Altman, G. B. (2010). Turning and positioning a client. In *Fundamental & advanced nursing skills* (3rd ed., pp. 352-353, 357-360). Clifton Park, NY: Delmar: Delmar, Cengage Learning. **(GI)**
2. Hudack, M. (2013). Prone positioning for patients with ARDS. *Nurse Practitioner*, 38(6), 10-12. doi:10. 1097/01.NPR.0000429897.4R997.6e **(GI)**
3. Johnson, N. J., Luks, A. M., & Glenny, R. W. (2017). Gas exchange in the prone posture. *Respiratory Care*, 62(8), 1097-1110. doi:10.4187/respcare.05512 **(RV)**
4. Lynn, P. (2015). Activity. In *Taylor's clinical nursing skills: A nursing process approach* (4th ed., pp. 488-494). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins. **(GI)**
5. Perry, A. G. (2017). Safe patient handling, transfer and positioning. In A. G. Perry, P. A. Potter, & W. R. Ostendorf (Eds.), *Clinical nursing skills & techniques* (9th ed., pp. 283-291). St. Louis: Mosby. **(GI)**
6. Prone positioning. (2017, November 17). *Lippincott Procedures*. Retrieved December 12, 2017, from <http://procedures.lww.com/lnp/view.do?pld=792605> **(PP)**
7. Robak, O., Schellongowski, P., Bojic, A., Laczika, K., Locker, G. J., & Staudinger, T. (2011). Short-term effects of combining upright and prone positions in patients with ARDS: A prospective randomized study. *Critical Care*. Retrieved August 27, 2014, from <http://ccforum.biomedcentral.com/articles/10.1186/cc10471> **(R)**
8. Sud, S., Friedrich, J. O., Taccone, P., Polli, F., Adhikari, N. K., Latini, R., & Gattinoni, L. (2010). Prone ventilation reduces mortality in patients with acute respiratory failure and severe hypoxemia: Systematic review and meta-analysis. *Intensive Care Medicine*, 36(4), 585-599. **(SR)**
9. Vollman, K., Dickinson, S., & Powers, J. (2017). AACN procedure manual for high acuity, progressive, and critical care. In *Pronation therapy* (7th ed., pp. 142-163). St. Louis, MO: Elsevier. **(GI)**
10. Vollman prone positioner. (n.d.). *Hill-Rom*. Retrieved December 21, 2017, from <http://www.steomedical.com/pdf/CTG297~1.PDF> **(GI)**