

Pronation Therapy – CE

ALERT

Prone positioning is contraindicated in patients who have increased intracranial pressure, hemodynamic instability, spinal cord injuries, maxillofacial injuries, or rib fractures, and in those who have had recent abdominal surgery.

Don appropriate personal protective equipment (PPE) based on the patient's signs and symptoms and indications for isolation precautions.

OVERVIEW

Pronation therapy, or prone positioning, is a short-term therapeutic modality used to improve oxygenation in patients with acute respiratory distress syndrome (ARDS). It involves turning the patient onto the abdomen in the face-down position.

ARDS is not a diffuse, homogenous disease that affects all areas of the lungs equally; instead, the dependent lung areas are more heavily damaged than the nondependent lung areas. Pronation therapy improves perfusion to less damaged areas of the lungs and improves ventilation-perfusion matching.³

Pronation therapy is indicated in patients with ARDS who have a partial pressure of arterial oxygen/fraction of inspired oxygen (PaO₂/FIO₂ or P/F) ratio less than or equal to 150 mm Hg.⁵ This therapy can be used to facilitate the mobilization of secretions and provide pressure relief, and it improves oxygenation⁶ and mortality in patients with ARDS.⁴

No standard has been established for the length of time a patient should remain in the prone position. For maximum benefit, the prone position may be used up to 20 hours a day.¹ The therapy is considered successful if the patient has an improvement in PaO₂ of greater than 10 mm Hg or an increase in the P/F ratio of 20 mm Hg within 30 minutes of being placed in the prone position.¹ The positioning schedule (length of time in the prone position and frequency of turning) is usually based on the patient's tolerance of the procedure, the success of the procedure in improving the patient's PaO₂, and the patient's ability to sustain improvements in PaO₂ when turned back to the supine position.

The most significant limitation to prone positioning is the actual mechanics of turning the patient. A number of methods are discussed in the literature, including manually turning the patient with the use of a single sheet, a turning system, or a turning frame and turning the patient with the use of the RotoProne[®] Therapy System.

Complications of the procedure include dislodgment or obstruction of tubes and drains, cardiac arrhythmias, hemodynamic instability, massive facial edema, pressure injuries, aspiration, and corneal ulcerations.

EDUCATION

- Provide developmentally and culturally appropriate education based on the desire for knowledge, readiness to learn, and overall neurologic and psychosocial state.

Pronation Therapy – CE

- Explain the patient's oxygenation issues and the reason for the use of pronation therapy, the perceived benefit, the frequency of assessments, the expected response, and the parameters for discontinuation.
- Explain the equipment and the procedure.
- Encourage questions and answer them as they arise.

ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact and don PPE as indicated for needed isolation precautions.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Assess the patient's respiratory status.
5. Assess the patient's hemodynamic status to determine his or her ability to tolerate a position change.
6. Obtain the patient's height and weight to determine the possibility of turning the patient within the confines of the bed frame and the risk of injury to the health care team members. Ensure that the height and weight do not exceed the manufacturer's recommended limits for commercial positioning systems.
7. Assess the patient's level of sedation and level of pain.

Preparation

1. Ensure that an adequate number of experienced, knowledgeable health care team members are available to perform the procedure.
2. If the patient is on a low air-loss surface, inflate it to the maximum level to make turning easier.
3. Administer sedatives and analgesics as prescribed. Reassess the patient's pain and sedation status, allowing for sufficient onset of action per medication, route, and the patient's condition.
4. Perform eye care, including lubricating the eyes and horizontal taping of the closed eyelids.
5. Apply a protective barrier (hydrocolloid or foam dressing) to the face and all bony prominence areas (e.g., shoulders, chest, iliac crest, elbows, tibial areas) as needed.
6. Ensure that the patient's tongue is inside his or her mouth. If the tongue is swollen or protruding, insert a bite block or an oropharyngeal airway.
7. Ensure that all lines, tubes, and drains are secure. Consider using two suture-less securement devices for central lines.³
 - a. Reposition all lines, tubes, and drains that are located above the patient's waist up toward the head of the bed.
 - b. Reposition all lines, tubes, and drains that are located below the waist down toward the foot of the bed.
8. Change dressings that are due to be changed during pronation therapy.
9. Empty ileostomy or colostomy bags before positioning. Place a pad around the stoma to prevent direct pressure on it.

Pronation Therapy – CE

10. Stop enteral feeding unless it is a postpyloric feeding.
11. Suction the patient's artificial airway and oral cavity.

PROCEDURE

Turning the Patient Prone Manually Using a Sheet – Arm Tuck Method

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.
 2. Verify the correct patient using two identifiers.
 3. Explain the procedure to the patient and ensure that he or she agrees to treatment.
 4. Verify that three to five health care team members are available to assist with the procedure.⁶
 - a. One health care team member is dedicated to the management of the head of the patient, the endotracheal (ET) tube, and the ventilator lines and coordinates the steps of the procedure.
 - b. Those health care team members stationed on each side of the bed maintain body contact with the bed at all times, serving as side rails to ensure a safe environment.
 - c. Additional health care team members may be needed if the patient is large or has numerous tubes and drains.
 5. Roll the patient on his or her side and tuck a flat sheet under him or her.
 6. Attach electrocardiogram (ECG) electrodes to the patient's back.
 7. Place the patient flat and pull the sheet through so that it is under him or her.
 8. Using the sheet under the patient, move him or her to the edge of the bed opposite the direction of the turn.
 9. Prepare the patient for the turn.
 - a. Turn the patient's head so that it is facing away from the direction of the turn.
 - b. Loop the ventilator tubing above the patient's head.

Rationale: These maneuvers prevent disconnection of the ventilator tubing or kinking of the ET tube during the turning procedure.
 - c. Cross the patient's leg closer to the edge of the bed over the opposite leg at the ankle.
 - d. Remove the ECG electrodes from the patient's chest.
 - e. Tuck the flat sheet around the arm that will be pulled underneath the patient when the turn is executed.
 - f. Position one arm up and one arm alongside the body while turning the patient's head in the direction of the upper arm.⁸
 - g. Place a second flat sheet on the bed and tuck it under the patient. This sheet will be pulled through as the patient is turned.
10. On a three count, roll the patient over into the prone position, using the sheet. The arm and sheet will pull across the bed. If the abdomen-unrestricted position is required, insert pillows under the head, chest, and pelvic region when the patient is tilted fully onto his or her side.
 11. Pull and center the patient in the bed. Discard the sheet that was used to place the patient in the supine position.

Pronation Therapy – CE

12. Correctly position all tubes, drains, and lines.

Rationale: All IV tubing and invasive lines are adjusted to prevent kinking, disconnection, or contact with the body during the turn and while the patient remains in the prone position.

13. Attach the ECG leads to the electrodes on the patient's back.

14. Rotate the patient's arms parallel to the body and then place them in a position of comfort.

The arms may be positioned by the head, aligned with the body, or one up and one down.

15. When the arm is in the up position, keep the shoulder in neutral position and the elbow at 90 degrees.⁸

Rational: Keeping the shoulder in neutral position and the elbow at 90 degrees prevents hyperextension of the shoulder.⁸

16. Place pillows under the patient's shins to raise the patient's ankles off the bed and to maintain the patient's feet in a dorsiflexed position.

17. If the patient is on a low air-loss surface, adjust the inflation as appropriate.

18. Adjust the bed to place the patient in reverse Trendelenburg position.

Rationale: Reverse Trendelenburg position is recommended to keep the head of the bed up to decrease edema and prevent complications associated with enteral feeding and aspiration.

19. Resume the tube feeding.

20. Discard supplies, remove PPE, and perform hand hygiene.

21. Document the procedure in the patient's record.

Turning the Patient Supine Manually Using a Sheet – Arm Tuck Method

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.

2. Verify the correct patient using two identifiers.

3. Explain the procedure to the patient and ensure that he or she agrees to treatment.

4. Verify that three to five health care team members are available to assist with the procedure.⁶

a. One health care team member is dedicated to the management of the head of the patient, the ET tube, and the ventilator lines and coordinates the steps of the procedure.

b. Those health care team members stationed on each side of the bed maintain body contact with the bed at all times, serving as side rails to ensure a safe environment.

c. Additional health care team members may be needed if the patient is large or has numerous tubes and drains.

5. Roll the patient on his or her side and tuck a flat sheet under him or her.

6. Attach ECG electrodes to the patient's chest.

7. Place the patient flat and pull the sheet through so that it is under him or her.

Pronation Therapy – CE

8. Using the sheet under the patient, move him or her to the edge of the bed opposite the direction of the turn.
9. Prepare the patient for the turn.
 - a. Turn the patient's head so that it is facing away from the direction of the turn.
 - b. Loop the ventilator tubing above the patient's head.

Rationale: These maneuvers prevent disconnection of the ventilator tubing or kinking of the ET tube during the turning procedure.

- c. Cross the patient's leg closer to the edge of the bed over the opposite leg at the ankle.
 - d. Remove the ECG electrodes from the patient's back.
 - e. Tuck the flat sheet around the arm that will be pulled underneath the patient when the turn is executed.
 - f. Tuck the patient's arms slightly under the buttocks.
 - g. Place a second flat sheet on the bed and tuck it under the patient. This sheet will be pulled through as the patient is turned.
10. On a three count, roll the patient over into the supine position, using the sheet. The arm and sheet will pull across the bed.
 11. Pull and center the patient in the bed. Discard the sheet that was used to place the patient in the prone position.
 12. Correctly position all tubes, drains, and lines.

Rationale: All IV tubing and invasive lines are adjusted to prevent kinking, disconnection, or contact with the body during the turn and while the patient remains in the supine position.

13. Attach the ECG leads to the electrodes on the patient's chest.
14. Rotate the patient's arms parallel to the body and then place them in a position of comfort.
15. If the patient is on a low air-loss surface, adjust the inflation as appropriate.
16. Adjust the bed to place the patient in the semi-Fowler position.
17. Resume the tube feeding.
18. Discard supplies, remove PPE, and perform hand hygiene.
19. Document the procedure in the patient's record.

Turning the Patient Prone Manually Using a Sheet – Jellyroll Method

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.
2. Verify the correct patient using two identifiers.
3. Explain the procedure to the patient and ensure that he or she agrees to treatment.
4. Verify that three to five health care team members are available to assist with the procedure.⁶
 - a. One health care team member is dedicated to the management of the head of the patient, the ET tube, and the ventilator lines and coordinates the steps of the procedure.

Pronation Therapy – CE

- b. Those health care team members stationed on each side of the bed maintain body contact with the bed at all times, serving as side rails to ensure a safe environment.
 - c. Additional health care team members may be needed if the patient is large or has numerous tubes and drains.
5. Roll the patient on his or her side and attach ECG electrodes to the patient's back. Return the patient to the supine position.
 6. Place long gel pads on top of the patient:

Use pillows if gel pads are not available.

- a. Place a long gel pad across the patient's chest just above the level of the axilla.
- b. Place a long gel pad across the patient's iliac crest.

Do not place the pad below the iliac crest as femoral nerve compression can occur.

- c. Place a long gel pad across the patient's thighs.
7. Prepare the patient for the turn.
 - a. Turn the patient's head so that it is facing the ventilator.
 - b. Loop the ventilator tubing above the patient's head.

Rationale: These maneuvers prevent disconnection of the ventilator tubing or kinking of the ET tube during the turning procedure.

- c. Place the patient's arms alongside of the body with the fingers pointing toward the feet. Turn the patient's hands palm down and tuck them beneath the patient's buttocks.
 - d. Cross the patient's legs at the ankle, placing the foot opposite the ventilator on top.
 - e. Remove the ECG electrodes from the patient's chest.
8. Cover the patient with a sheet. Fold down the top of the sheet to expose the patient's head.
 9. Along both sides of the patient, grab the top and bottom sheets together and tightly roll them up to the side of the patient sandwiching the patient firmly between the sheets.
 10. Slide the patient to the side of the bed opposite of the ventilator.
 11. On a three count, roll the patient over into the prone position, tightly holding the rolled-up sheets on each side of the patient.
 12. Unfold the flat sheet that is under the patient's head.
 13. Pull and center the patient in the bed.
 14. Correctly position all tubes, drains, and lines.

Rationale: All IV tubing and invasive lines are adjusted to prevent kinking, disconnection, or contact with the body during the turn and while the patient remains in the prone position.

Pronation Therapy – CE

15. Attach the ECG leads to the electrodes on the patient's back.
16. Rotate the patient's arms parallel to the body and then place them in a position of comfort. The arms may be positioned by the head, aligned with the body, or one up and one down.
17. When the arm is in the up position, keep the shoulder in neutral position and the elbow at 90 degrees.⁸

Rational: Keeping the shoulder in neutral position and the elbow at 90 degrees prevents hyperextension of the shoulder.⁸

18. Place pillows under the patient's shins to raise the patient's ankles off the bed and to maintain the patient's feet in a dorsiflexed position.
19. If the patient is on a low air-loss surface, adjust the inflation as appropriate.
20. Adjust the bed to place the patient in reverse Trendelenburg position.

Rationale: Reverse Trendelenburg position is recommended to keep the head of the bed up to decrease edema and prevent complications associated with enteral feeding and aspiration.

21. Resume the tube feeding.
22. Discard supplies, remove PPE, and perform hand hygiene.
23. Document the procedure in the patient's record.

Turning the Patient Supine Manually Using a Sheet – Jellyroll Method

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.
2. Verify the correct patient using two identifiers.
3. Explain the procedure to the patient and ensure that he or she agrees to treatment.
4. Verify that three to five health care team members are available to assist with the procedure.⁶
 - a. One health care team member is dedicated to the management of the head of the patient, the ET tube, and the ventilator lines and coordinates the steps of the procedure.
 - b. Those health care team members stationed on each side of the bed maintain body contact with the bed at all times, serving as side rails to ensure a safe environment.
 - c. Additional health care team members may be needed if the patient is large or has numerous tubes and drains.
5. Roll the patient on his or her side and attach ECG electrodes to the patient's chest. Return the patient to the supine position.
6. Prepare the patient for the turn.
 - a. Turn the patient's head so that it is facing the ventilator.
 - b. Loop the ventilator tubing above the patient's head.

Rationale: These maneuvers prevent disconnection of the ventilator tubing or kinking of the ET tube during the turning procedure.

Pronation Therapy – CE

- c. Place the patient's arms alongside of the body with the fingers pointing toward the feet.
 - d. Cross the patient's legs at the ankle, placing the foot opposite the ventilator on top.
 - e. Remove the ECG electrodes from the patient's back.
 - f. Fold down the top of the flat sheet that is under the patient's head.
7. Along both sides of the patient, grab the top and bottom sheets together and tightly roll them up to the side of the patient sandwiching the patient firmly between the sheets.
 8. Slide the patient to the side of the bed opposite of the ventilator.
 9. On a three count, roll the patient over into the supine position, tightly holding the rolled-up sheets on each side of the patient.
 10. Pull and center the patient in the bed.
 11. Correctly position all tubes, drains, and lines.

Rationale: All IV tubing and invasive lines are adjusted to prevent kinking, disconnection, or contact with the body during the turn and while the patient remains in the prone position.

12. Attach the ECG leads to the electrodes on the patient's chest.
13. Place the patient's arms in a position of comfort.
14. If the patient is on a low air-loss surface, adjust the inflation as appropriate.
15. Adjust the bed to place the patient in the semi-Fowler position.
16. Resume the tube feeding.
17. Discard supplies, remove PPE, and perform hand hygiene.
18. Document the procedure in the patient's record.

Turning the Patient Prone Manually Using the Vollman Prone Positioner

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.
2. Verify the correct patient using two identifiers.
3. Explain the procedure to the patient and ensure that he or she agrees to treatment.
4. Position one health care team member on either side of the bed and a third health care team member at the head of the bed.⁸

Rationale: Three health care team members are required for the turn; two perform the actual lifting and turning, while the third is positioned at the head of the bed.⁸ Those health care team members stationed on either side of the bed maintain body contact with the bed at all times, serving as side rails to ensure a safe environment. Additional health care team members may be required based on the size of the patient.

5. Place the straps, which secure the positioner to the body, beneath the patient's head, chest (axillary area), and pelvic region.
6. Remove the ECG electrodes from the patient's chest.

Pronation Therapy – CE

7. Attach the frame to the patient while he or she is in the supine position. Lay the frame gently on top of the patient. Align the chest piece to rest between the clavicle and the sixth rib.

Rationale: The chest piece is the only immovable part and serves as the marker for proper placement of the device.

8. Adjust the pelvic piece to rest just above the iliac crest.

Rationale: This position prevents direct pressure over bony prominences and provides sufficient distance between the chest and pelvis to allow the abdomen to be free of restriction and prevent bowing of the back.

9. Adjust the forehead and chin pieces to provide full facial support in a face-down or side-lying position without interfering with the ET tube.

If the patient has a limited neck range of motion or a short neck, the face-down position is optimal.

Because readjusting the head to relieve pressure points is difficult, move both headpieces to the top of the frame. Only the head cushion supports the forehead, and the chin is suspended to reduce the risk of skin breakdown from pressure.

10. Fasten the positioner to the patient using the soft, adjustable straps. As the straps are tightened, the cushions compress. When the positioner is fastened, lift it to assess whether a secure fit has been obtained. Readjust as necessary.

Rationale: If the device is not secured tightly before the turn, the patient may develop shear or friction injuries on the chest and pelvic area during the turn.

When secured correctly, the device appears uncomfortable and possibly painful, but it creates a feeling of pressure as well as a sense of security for the patient during the turning process.

11. Using a drawsheet, pull the patient to the edge of the bed opposite the direction of the turn.

12. Prepare the patient for the turn.

- a. Tuck the straps on the bar between the chest and pelvic piece underneath the patient.
- b. Tuck the patient's arm and hand resting in the center of the bed under the buttocks.
- c. Cross the patient's leg closer to the edge of the bed over the opposite leg at the ankle.

13. Turn the patient to a 45-degree angle⁷ toward the designated side.

- a. The health care team member on the side of the bed toward which the patient is turned grips the upper steel bar.
- b. The health care team member on the opposite side of the bed grasps the straps attached to the lower steel bar.

Pronation Therapy – CE

14. On a three count, lift the patient by the frame into a prone position.

Ensure that the health care team member at the head of the bed supports the head and the artificial airway during the turn, while ensuring that all tubes and lines are secure.

15. Loosen the straps. If the patient is unstable, keep the straps fastened securely to facilitate a safe, quick return to the supine position in the event of an emergency.

16. Correctly position all tubes, drains, and invasive lines.

Rationale: All IV tubing and invasive lines are adjusted to prevent kinking, disconnection, or contact with the body during the turn and while the patient remains in the prone position.

17. Attach the ECG electrodes to the patient's back.

18. Rotate the patient's arms parallel to the body and then place them in a position of comfort.

The arms may be positioned by the head, in a side-lying position, aligned with the body, or one up and one down. Place a pillow under the ankle area.

A pillow under the ankles allows correct body alignment and prevents tension on the tendons in the foot and ankle region. If the patient is tall enough, dangling the feet over the edge of the mattress may be a sufficient alternative to supporting the ankles and feet in correct alignment.

19. If the patient is on a low air-loss surface, adjust the inflation as appropriate.

20. Adjust the bed to place the patient in reverse Trendelenburg position.

Rationale: Reverse Trendelenburg position is recommended to keep the head of the bed up to decrease edema and prevent complications associated with enteral feeding and aspiration.

21. Resume the tube feeding.

22. Discard supplies, remove PPE, and perform hand hygiene.

23. Document the procedure in the patient's record.

Turning the Patient Supine Manually Using the Vollman Prone Positioner

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.

2. Verify the correct patient using two identifiers.

3. Explain the procedure to the patient and ensure that he or she agrees to treatment.

4. Position one health care team member on either side of the bed and a third health care team member at the head of the bed.⁸

Rationale: Three health care team members are required for the turn; two perform the actual lifting and turning, while the third is positioned at the head of the bed.⁸ Those health care team members stationed on either side of the bed maintain body

Pronation Therapy – CE

contact with the bed at all times, serving as side rails to ensure a safe environment. Additional health care team members may be required based on the size of the patient.

5. Remove the ECG electrodes from the patient's back.
6. Fasten the positioner to the patient using the soft, adjustable straps if they were loosened while the patient was prone. As the straps are tightened, the cushions compress. When the positioner is fastened, lift it to assess whether a secure fit has been obtained. Readjust as necessary.

Rationale: If the device is not secured tightly before the turn, the patient may develop shear or friction injuries on the chest and pelvic area during the turn.

When secured correctly, the device appears uncomfortable and possibly painful, but it creates a feeling of pressure as well as a sense of security for the patient during the turning process.

7. Using a drawsheet, pull the patient to the edge of the bed opposite the direction of the turn.
8. Prepare the patient for the turn.
 - a. Tuck the patient's arm and hand resting in the center of the bed under the buttocks.
 - b. Cross the patient's leg closer to the edge of the bed over the opposite leg at the ankle.
9. Turn the patient to a 45-degree angle⁷ toward the designated side.
 - a. The health care team member on the side of the bed toward which the patient is turned grips the upper steel bar.
 - b. The health care team member on the opposite side of the bed grasps the straps attached to the lower steel bar.
10. On a three count, lift the patient by the frame into a supine position.

Ensure that the health care team member at the head of the bed supports the head and the artificial airway during the turn, while ensuring that all tubes and lines are secure.

11. Loosen the straps and remove the frame.
12. Correctly position all tubes, drains, and invasive lines.

Rationale: All IV tubing and invasive lines are adjusted to prevent kinking, disconnection, or contact with the body during the turn and while the patient remains in the supine position.

13. Attach the ECG electrodes to the patient's chest.
14. Rotate the patient's arms parallel to the body and then place them in a position of comfort.
15. If the patient is on a low air-loss surface, adjust the inflation as appropriate.

Pronation Therapy – CE

16. Adjust the bed to place the patient in the semi-Fowler or reverse Trendelenburg position.

Rationale: Reverse Trendelenburg position is recommended to keep the head of the bed up to decrease edema and prevent complications associated with enteral feeding and aspiration.

17. Unfasten the positioner and remove it from the patient. Leave the straps under the patient in preparation for the next turn.

18. Resume the tube feeding.

19. Discard supplies, remove PPE, and perform hand hygiene.

20. Document the procedure in the patient's record.

Turning the Patient Using the RotoProne Therapy System

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.

2. Verify the correct patient using two identifiers.

3. Explain the procedure to the patient and ensure that he or she agrees to treatment.

4. After removing all removable pieces from the RotoProne surface, move the patient from the bed to the RotoProne surface.

5. Position the patient in the center of the surface with the head in the attached head support and the ears visible through the ear holes on the headpiece.

6. Position all tubes and invasive lines.

Rationale: All IV tubing and invasive lines are adjusted to prevent kinking, disconnection, or contact with the body during the turn and while the patient remains in the prone position.

Add extension tubing, as necessary, to lines that are too short to be placed at the head or end of the bed.

a. Align the lines inserted in the upper torso with either shoulder and position them at the head of the bed in the tube management system.

b. Align chest tubes and lines or tubes placed in the lower torso with either leg and extend them through the center hole at the foot of the RotoProne surface.

7. Follow the manufacturer's recommendations for securing the patient on the therapy surface.

a. Place the leg piece and side packs on the surface. Ensure that the patient is snugly secured within the side packs.

Rationale: If the side packs are not secured tightly before the turn, the patient may develop shear or friction injuries during the turn. All packs need to be positioned to prevent undue pressure on the patient's body surfaces and avoid malposition of joints (hyperextension of knees and hips in the prone position).

b. Place the abdominal support mesh over the patient's abdomen.

Pronation Therapy – CE

- c. Position the additional pads on the patient (lower leg packs over the shins, pelvic packs along the iliac crests, chest pack).

Rationale: Positioning the pads prevents direct pressure over bony prominences and provides sufficient distance between the chest and pelvis to allow the abdomen to be free of restriction and prevent bowing of the back.

- d. Tighten the headpiece snugly around the patient's head.
- e. Position all packs snugly over the patient.

Tighten chest pads last because constriction of the chest may restrict the patient's ventilatory effort and increase peak airway pressure.

- f. Place the face pack on the patient's face, ensuring that the top pad is above the eyebrows and that the side pieces frame the mouth.
8. On the touch screen at the foot of the bed, set therapy on the RotoProne to rotate the patient into the prone position by turning the patient toward the direction of the ventilator.
9. Check the tubing, airway, and head support and press the corresponding button on the touch screen after each check.

During the procedure, have another health care team member monitor invasive lines and ventilator tubing to ensure that they are positioned correctly. In the absence of another health care team member, use the hand control unit at the head of the bed to turn the patient so that all invasive lines and tubes are visible during turning.

10. Press the "Rotate" button.

Rationale: The patient must be rotated before being turned prone.

11. Press the "Prone" button.
12. Press and hold the "Rotate and Lower" button until the screen changes.
13. Check the tubing, airway, head support, abdominal support, and arm slings and then press the corresponding button on the screen.
14. Reconfirm the position of the face pack and press the button on the touch screen.

The face pack is the only piece without a safety sensor.

15. Press the "Prone" button and hold it during the entire turning procedure. Alternatively, press the "Prone/Supine" button on the hand control unit.

Release the button if the need arises to stop the turning procedure because of kinking or pulling on tubes.

16. Check the tubing, airway, and head support and press the corresponding buttons on the touch screen after each check.

Pronation Therapy – CE

17. Press the “Rotate” button. Adjust the rotation and pause times on each side based on the patient’s response to therapy.
18. Press the “Surface Position” button.
19. Place the patient in reverse Trendelenburg position by pressing and holding the corresponding button on the touch screen until the head of the bed is tilted upward at a slight angle.

Rationale: Reverse Trendelenburg position is recommended to keep the head of the bed up to decrease edema and prevent complications associated with enteral feeding and aspiration.

20. Resume the tube feeding.
21. Open the back and foot hatches when the patient is in the prone position.

Rationale: All back hatches can be opened to allow full chest expansion. The foot hatch should be opened and propped open to prevent undue pressure on the heels.

22. Determine the length of time to leave the patient in the prone position based on his or her response to prone positioning.
23. After the time in the prone position is complete, place the patient supine for a designated time as tolerated.
 - a. The positioning schedule is based on whether the patient is able to sustain improvements in PaO₂ made while in the prone or supine position.
 - b. The health care team may decide to vary the recommended time intervals and rotation times based on the patient’s response to therapy.
 - c. Press the “Therapy Settings” button to change the degree of rotation or pause times.

If the need arises to return the patient to the supine position quickly, use the “CPR” button on the touch screen or below the screen at the foot of the bed.

24. Turn the patient to the supine position.
 - a. Close all open hatches.
 - b. Stop the tube feeding.
 - c. Press the “Supine” button.
 - d. Press and hold the “Rotate and Lower” button until the screen changes.
 - e. Check the tubing, airway, and head support and press the corresponding button after each check.
 - f. Press the “Supine” button and hold it during the entire turning procedure. Alternatively, press the “Prone/Supine” button on the hand control.
 - g. Insert the locking pin after the patient assumes the supine position.
 - h. Open the packs over the patient as needed for patient care.
 - i. Carefully remove the face pack.

Pronation Therapy – CE

25. Before rotating the supine patient, secure the lower leg packs and either the chest or pelvic packs over the patient.

Placement of the lower leg packs and either the chest or pelvic packs is required for supine rotation.

26. Rotate the patient as tolerated.
27. Place the patient in reverse Trendelenburg position, elevating the head of the bed slightly by pressing the “Surface Position” button and then pressing “Reverse Trendelenburg.”
28. Resume the tube feeding.
29. Discard supplies, remove PPE, and perform hand hygiene.
30. Document the procedure in the patient’s record.

Turning the Patient Prone Using the Mölnlycke® Tortoise™ Turning and Positioning System

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient’s signs and symptoms and indications for isolation precautions.
2. Verify the correct patient using two identifiers.
3. Explain the procedure to the patient and ensure that he or she agrees to treatment.
4. Verify that three to five health care team members are available to assist with the procedure.⁶
 - a. One health care team member is dedicated to the management of the head of the patient, the ET tube, and the ventilator lines and coordinates the steps of the procedure.
 - b. Those health care team members stationed on each side of the bed maintain body contact with the bed at all times, serving as side rails to ensure a safe environment.
 - c. Additional health care team members may be needed if the patient is large or has numerous tubes and drains.
5. Place the patient on the Tortoise pad if not already in use.
 - a. Roll the patient on his or her side and slide the Tortoise pad and the proning pad under the patient.
 - b. Align the proning pad seam with the Tortoise pad seam and the top of the pad.
 - c. Attach ECG electrodes to the patient’s back while on his or her side.
6. If the Tortoise pad is already in place, untuck the bottom, or tail, of the pad, then continue to place the proning pad under the patient.
 - a. Roll the patient to his or her other side and pull pad(s) through. Return the patient to the supine position.
 - b. Attach ECG electrodes to the patient’s back while on his or her side (Figure 1).
7. Using the boosting handles, pull the Tortoise pad to the side of the bed that the patient will be turned to.
8. Using the proning pad handles, pull the patient toward the other side of the bed.
9. Place a clean sheet over the Tortoise pad, tucking it under the proning pad.

Pronation Therapy – CE

10. Prepare the patient for the turn.
 - a. Turn the patient's head so that it is facing the ventilator.
 - b. Loop the ventilator tubing above the patient's head.

Rationale: These maneuvers prevent disconnection of the ventilator tubing or kinking of the ET tube during the turning procedure.

- c. Place the patient's arms alongside of the body with the fingers pointing toward the feet. Turn the patient's hands palm down and tuck them beneath the patient's buttocks.
 - d. Cross the patient's legs at the ankle, placing the foot opposite the ventilator on top.
 - e. Remove the ECG electrodes from the patient's chest.
11. On a three count, roll the patient to a prone position using the proning pad handles.
 12. Remove the proning pad.
 13. Reinsert the proning pad beneath the patient by partially turning each direction to get the pad underneath.
 14. Align the proning pad with the Tortoise pad and pull the Tortoise pad boosting straps through the handles on the proning pad.
 15. Pull and center the patient in the bed.
 16. Tuck the bottom, or tail, of the Tortoise pad under the body of the Tortoise pad.
 17. Correctly position all tubes, drains, and lines.

Rationale: All IV tubing and invasive lines are adjusted to prevent kinking, disconnection, or contact with the body during the turn and while the patient remains in the prone position.

18. Attach the ECG leads to the electrodes on the patient's back.
19. Rotate the patient's arms parallel to the body and then place them in a position of comfort. The arms may be positioned by the head, aligned with the body, or one up and one down.
20. When the arm is in the up position, keep the shoulder in neutral position and the elbow at 90 degrees.⁸

Rational: Keeping the shoulder in neutral position and the elbow at 90 degrees prevents hyperextension of the shoulder.⁸

21. Place pillows under the patient's shins to raise the patient's ankles off the bed and to maintain the patient's feet in a dorsiflexed position.
22. Use the fluidized positioners to support the patient's head, make space for equipment, and to position the patient left or right.
23. If the patient is on a low air-loss surface, adjust the inflation as appropriate.
24. Adjust the bed to place the patient in reverse Trendelenburg position.

Pronation Therapy – CE

Rationale: Reverse Trendelenburg position is recommended to keep the head of the bed up to decrease edema and prevent complications associated with enteral feeding and aspiration.

25. Resume the tube feeding.
26. Discard supplies, remove PPE, and perform hand hygiene.
27. Document the procedure in the patient's record.

Turning the Patient Supine Manually Using the Möhlycke Tortoise Turning and Positioning System

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient's signs and symptoms and indications for isolation precautions.
2. Verify the correct patient using two identifiers.
3. Explain the procedure to the patient and ensure that he or she agrees to treatment.
4. Verify that three to five health care team members are available to assist with the procedure.
 - a. One health care team member is dedicated to the management of the head of the patient, the ET tube, and the ventilator lines and coordinates the steps of the procedure.
 - b. Those health care team members stationed on each side of the bed maintain body contact with the bed at all times, serving as side rails to ensure a safe environment.
 - c. Additional health care team members may be needed if the patient is large or has numerous tubes and drains.
5. Untuck the bottom or tail of the Tortoise pad.
6. Prepare the patient for the turn.
 - a. Turn the patient's head so that it is facing the ventilator.
 - b. Loop the ventilator tubing above the patient's head.

Rationale: These maneuvers prevent disconnection of the ventilator tubing or kinking of the ET tube during the turning procedure.

- c. Place the patient's arms alongside of the body with the fingers pointing toward the feet.
 - d. Cross the patient's legs at the ankle, placing the foot opposite the ventilator on top.
 - e. Remove the ECG electrodes from the patient's back.
7. Separate the proning pad handles from the Tortoise pad handles.
 8. Using the proning pad handles, pull the patient to the side of the bed toward the ventilator.
 9. Pull the Tortoise pad the opposite direction.
 10. Place a sheet on the Tortoise pad and tuck beneath the proning pad.
 11. On a three count, roll the patient to a supine position using the proning pad handles.
 12. Remove the proning pad and pull the sheet flat underneath the patient.
 13. Pull and center the patient in the bed.
 14. Correctly position all tubes, drains, and lines.
 15. Attach the ECG leads to the electrodes on the patient's chest.

Pronation Therapy – CE

16. Place the patient's arms in a position of comfort.
17. If the patient is on a low air-loss surface, adjust the inflation as appropriate.
18. Adjust the bed to place the patient in the semi-Fowler position.
19. Use fluidized positioners to offload any areas as needed.
20. Resume the tube feeding.
21. Discard supplies, remove PPE, and perform hand hygiene.
22. Document the procedure in the patient's record.

MONITORING AND CARE

1. Assess the patient's hemodynamic and oxygenation status after placing him or her in the prone position.

Rationale: The response time varies among patients. Some patients immediately respond; others may take several hours to show maximal response to the position change.

Reportable conditions: Decreasing peripheral oxygen saturation, hemodynamic instability

2. With manual positioning, reposition the patient's head while he or she is in the prone position to prevent facial skin breakdown. While one health care team member lifts the patient's head, the second health care team member moves the headpieces to provide support in a different position.

Rationale: The face and ears have minimal structural padding to reduce the risk of skin breakdown. Patients with short necks or limited neck range of motion have difficulty assuming a head side-lying position. These patients are more likely to develop facial skin breakdown.

Reportable condition: Skin breakdown

3. Assess the skin frequently and with each repositioning of the head for areas of nonblanchable redness or breakdown.

Rationale: Patients requiring prone positioning are at risk for skin breakdown, particularly to facial areas and bony prominences. Frequent, patient specific assessment is needed to prevent pressure injury.

Reportable conditions: Nonblanchable redness, shearing and friction injuries

4. Provide frequent oral care and suction the airway as needed.

Rationale: The prone position promotes postural drainage. Drainage from the nares may be a sign of an undetected sinus infection.

Pronation Therapy – CE

Reportable conditions: Drainage from the nares, change in the amount or character of secretions

5. Maintain tube feedings as tolerated.

Rationale: Tube feedings should continue even during pronation therapy.

Reportable condition: Evidence of tube-feeding material when suctioning

6. Maintain the positioning schedule and check whether the patient is able to sustain improvements in PaO₂ made while in the prone position.

Reportable condition: Decreases in oxygenation saturation

7. If the patient experiences a cardiopulmonary arrest and cannot be turned supine, perform cardiopulmonary resuscitation (CPR) in the prone position over the midthoracic spine.

- a. Position hands one vertebral level below the line crossing both the inferior angles of the scapula.²

Rationale: One vertebral level below the line crossing both the inferior angles of the scapula corresponds to the largest cross-sectional area of the left ventricle.

- b. Perform CPR at the same depth and rate as if the patient were supine.

Rationale: Pressure can be applied to both direct compression on the middle thoracic spine and bilateral compression methods if the spine is unstable.²

8. Assess, treat, and reassess pain.

EXPECTED OUTCOMES

- Increased oxygenation
- Improved secretion clearance
- Improved lung compliance

UNEXPECTED OUTCOMES

- Agitation
- Disconnection or dislodgment of tubes and lines
- Peripheral arm nerve injury
- Periorbital and conjunctival edema
- Skin injuries or pressure injuries
- Eye pressure or injury
- Aspiration of enteral feeding

Pronation Therapy – CE

DOCUMENTATION

- Education
- Patient's tolerance of the procedure
- Length of time in the prone position
- Maximal oxygenation response while in the prone position
- Oxygenation response when returned to the supine position
- Positioning schedule
- Complications noted during and after the procedure
- Amount and type of secretions
- Unexpected outcomes and related interventions
- Pain assessment and management
- Sedation assessment and management

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ADDITIONAL READINGS

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Pronation Therapy – CE

*In these skills, a “classic” reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

AACN Levels of Evidence

- **Level A** - Meta-analysis of quantitative studies or metanalysis of qualitative studies with results that consistently support a specific action, intervention, or treatment
- **Level B** - Well-designed, controlled studies, with results that consistently support a specific action, intervention, or treatment
- **Level C** - Qualitative studies, descriptive or correlational studies, integrative reviews, systematic reviews, or randomized controlled trials with inconsistent results
- **Level D** - Peer-reviewed professional organizational standards with clinical studies to support recommendations
- **Level E** - Multiple case reports, theory-based evidence from expert opinions, or peer-reviewed professional organizational standards without clinical studies to support recommendations
- **Level M** - Manufacturer's recommendations only

SUPPLIES

- Gloves and PPE, as indicated
- Eye lubricant
- Bite block or oral airway
- Protective dressings

Turning the Patient Manually Using a Sheet – Arm Tuck Method

- Flat sheets
- Pillows

Turning the Patient Manually Using a Sheet – Jellyroll Method

- Flat sheets
- 3 gel pads or pillows
- Pillows

Turning the Patient Manually Using the Vollman Prone Positioner

- Vollman Prone Positioner (this device is no longer manufactured)
- Pillows

Turning the Patient Using the RotoProne® Therapy System

- RotoProne Therapy System

Turning the Patient Manually Using the Mölnlycke® Tortoise™ Turning and Positioning System

- Flat sheets
- Tortoise pad

Pronation Therapy – CE

- Proning pad
- Fluidizing positioners, one for the head and one for the torso

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