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**Clinical Guidelines for
Pronation Therapy for Patients with
Acute Respiratory Distress Syndrome
(ARDS)**

The Pronation Therapy Guidelines have been reviewed and approved by:

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I. PURPOSE:

The New York City Health and Hospitals Corporation Clinical Guidelines for Pronation Therapy for Patients with Acute Respiratory Distress Syndrome (ARDS) was adopted to ensure appropriate and safe positioning of patients in accordance with the best available evidence to prevent respiratory complications and improve patient outcomes. The prone position is used in an attempt to improve oxygenation and reduce ventilator- induced lung injury in patients with acute respiratory distress syndrome (ARDS).

11. SCOPE:

This guideline applies to all patient care areas where Pronation Therapy is indicated. The interdisciplinary team includes physicians, nurses, support staff, and respiratory therapist. The team is responsible in ensuring appropriate and safe pronation therapy for patients with ARDS.

III. POLICY

No consent is necessary as this procedure is integrated into the standards of care. However, the provider will explain the procedure to the patient, family members or significant other about the indication, risks and benefits of pronation therapy.

The time out policy is executed in accordance with the individual facility time out policy and procedures.

A. INDICATIONS

Must meet the Berlin Criteria for ARDS. See Table below

Berlin Criteria for Acute Respiratory Distress Syndrome (2012)

Criteria	Assessment Data
Timing	Within 1 week of clinical insult or new or worsening symptoms
Chest imaging	Bilateral opacities that are not explained by effusions, collapse, or nodules
Edema	Respiratory failure not explained by cardiac failure or fluid overload
Oxygenation*	
Mild	PaO ₂ /FIO ₂ 200 mm Hg to ≤ 300 mm Hg with PEEP/CPAP ≥5 cm H ₂ O
Moderate**	PaO ₂ /FIO ₂ 100 mm Hg to ≤ 200 mm Hg with PEEP ≥ 5 cm H ₂ O
Severe	PaO ₂ /FIO ₂ ≤ 100 mm Hg with PEEP ≥ 5 cm H ₂ O

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**The prone position may be indicated in patients diagnosed with acute respiratory distress syndrome demonstrating severe hypoxemia, defined as a partial < 150mmHg with an FIO2 of at least 60% and positive end-expiratory pressure (PEEP) of at least 5 cm H2O and a tidal volume close to 6 ml/kg of predicted body weight. **Recommended if P/F <150 for 12 hours or worsening oxygenation after intubation without other cause*

B. CONTRAINDICATIONS

Absolute	Relative
Shock (e.g., persistent mean arterial pressure <65 mmHg)	Recent DVT treated for <2 days
Acute bleeding (e.g., hemorrhagic shock, massive hemoptysis)	Anterior chest tube(s) with air leaks
Multiple fractures or trauma (e.g., unstable fractures of femur, pelvis, face)	Major abdominal surgery
Spinal instability	Cardiac pacemaker inserted in the last 2 days
Pregnancy	Clinical conditions limiting life expectancy* (e.g., oxygen or ventilator-dependent respiratory failure)
Raised intracranial pressure >30 mmHg or cerebral perfusion pressure <60 mmHg	Severe burns
Hemodynamic instability (SBP < 90 mmHg with fluid and vasoactive medications)	Lung transplant recipient
Central Cannulation for ECMO, BiVAD	Recent DVT treated for <2 days
	History of difficult endotracheal intubation
	Nasotracheal intubation
	Inadequate sedation or agitation
	Tracheal surgery or sternotomy within two weeks
	Unstable chest wall, open chest wound

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C. TEAM ROLES *(Figure 1)*



Figure 1: Pronation Team

- **Respiratory therapist (RT):** at head of bed, responsible for securing ET tube and head during turn (note distance of ETT); leads the three-count call
 - **MD:** present on the floor, monitors and patient status
 - **1-2 RN/PCA:** side of bed, side of ventilator - turn is towards this side, removes monitor leads on chest of patient when in lateral decubitus side
 - **1-2 RN/PCA:** side of bed, opposite of ventilator – turn is away from this side, prepare towels for padding and prepare monitor leads to place on patients back after pronation
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- **1 RN Lead:** side or foot of bed, assistance as needed; verify that three to five health care team members were available to assist with the procedure; would also act to call the time-out and the procedure reader
- **1 Runner:** present outside the patient's room; can be anyone familiar with the layout of the unit/facility; receives instructions from the team leader; clearly states, "I am going...", "I am getting."

D. INDICATIONS FOR RETURNING PATIENT TO SUPINE POSITION/DISCONTINUATION OF PRONE POSITION

- Unstable vital signs – including rapid deterioration of blood pressure or SaO₂
 - Inability to care for the patient (e.g., multiple procedures that require a non-prone position)
 - 3 days of prone (e.g., no change in the patient's gas exchange or mechanics or worsening of gas exchange or cardiovascular status ventilation without improvement in oxygenation or lung mechanics)
 - Improvement such that requiring FiO₂ < 60% and PEEP <10mmHg for 12 hours
 - Decision to proceed to ECMO
 - Prone therapy is discontinued when the patient no longer shows a positive response to the position change or mechanical ventilation support has been optimized.
 - Prone positioning can be stopped when following criteria were met:
 - Improvement in oxygenation, PaO₂/FiO₂ ≥ 150 mmHg, with an FiO₂ < 60% with ≤ 10 cm of PEEP (this criterion must be met in the supine position at least 4 hours after the end of the last prone session)
 - PaO₂/FiO₂ ratio of more than 20% relative to the ratio in the supine position before consecutive sessions.
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- Complications occurring during prone session: unscheduled extubation, ETT obstruction, hemoptysis, oxygen saturation <85% for greater than 10 minutes or a PaO₂ of <55 mmHg for more than 5 minutes, any life- threatening situations.

IV. PROCEDURE AND MANAGEMENT OF THE PATIENT IN PRONE POSITION

A. General Consideration

- MD and pronation team must remain at bedside until patient deemed stable – if acute desaturation <90% or blood pressure drops 25mmHg or arrhythmia, return to supine position
- Baseline head to toe assessment including skin assessment performed by nurse
- Repeat ABG 30 minutes after position change; monitor oxygen saturation
- Perform microturns of the head every hour
- Evaluate security of ET tube every hour; document ETT tube number at the teeth before and after pronation and Q4 hours
- Change swimmer's position Q4 hours
- Assess pressure points every two hours
- Resume tube feeding at rate prior to pronation, if applicable
- Maintain prone position for 16 hours by placing bed in reverse Trendelenburg position

B. Preparation phase: Gather Supplies

- 2 Draw sheets
 - 3 pillows (consider 6 with 2 in each pillow case if obese)
 - Foam dressings for pressure points
 - Bite block
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- Closed tracheal suction swivel connector
- 2 sets of ECG electrode pads
- Eye patches and ointment
- Positioning pads where available
- Chux
- Flushes
- Syringes
- Skin care wipes

C. Pre-Maneuver Phase

- Obtain arterial blood gas if O₂ saturation is less or equal to 90%
 - Confirm that patient meets the criteria for Pronation Therapy
 - Obtain a written order in EPIC (see EPIC Tip Sheet)
 - Withhold tube feedings for 30 minutes prior to prone positioning
 - Assess and record baseline pulmonary and hemodynamic data: heart rate, blood pressure, respiratory rate, ventilator settings, O₂ saturation
 - Change dressings that were due to be changed during pronation therapy. Ensure central and arterial lines are secured in place
 - Suction the patient's artificial airway and oral cavity. Ensure ETT/tracheostomy tubes are secure
 - Empty drains and Foley bags if applicable. Inflate the bed it to the maximum level to make turning easier.
 - Sedate to RASS score of -4 or -5 and paralyze with NMBAs
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- Pre-oxygenate with 100% FiO₂
- Place ophthalmic lubricant in eyes – cover with eye patches. Ensure eyes are closed and free from direct pressure. Can use artificial tears or bacitracin/erythromycin-based antibiotics as ordered.
- Apply foam dressing/protective barrier liberally to pressure points (*Figure 2*)

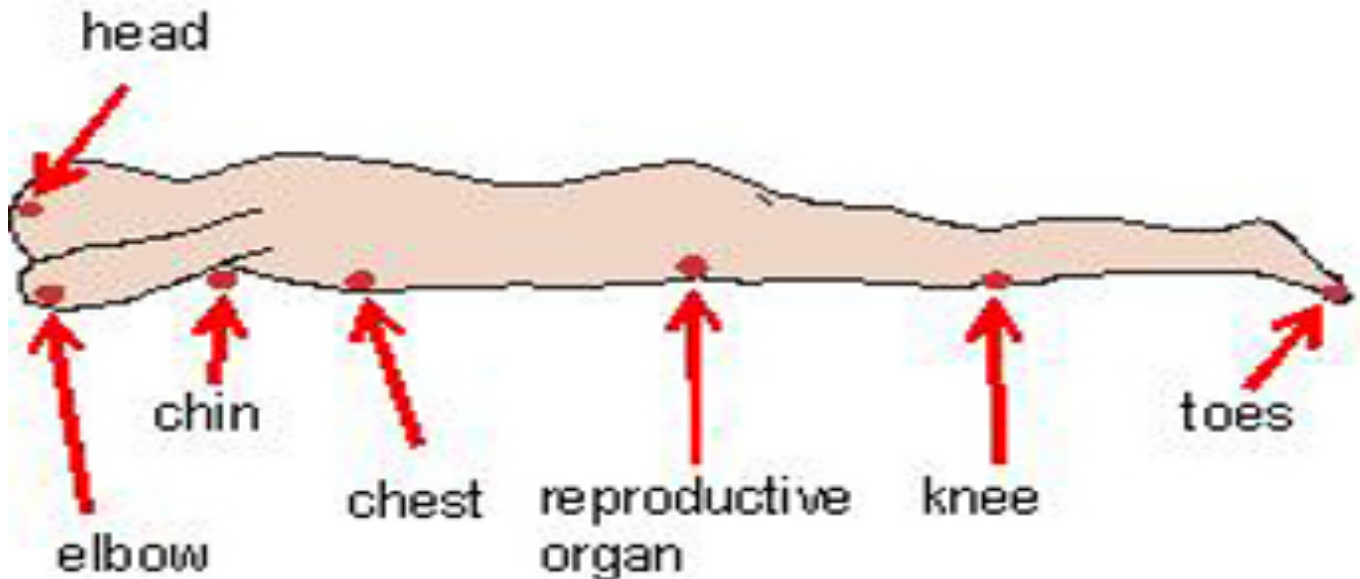


Figure 2: Bony prominences

- Ensure that the patient's tongue is inside mouth. If the tongue is swollen or protruding, insert a bite block or an oropharyngeal airway.
- Arrange all lines are secured; catheters and drains to go either of head of bed (if line above the waist) or off foot of bed (if line below the waist)

D. Maneuver Phase with/without Positioning Pads

- Introduce self to patient if awake; sedate as per protocol
- Gather the pronation team which consists of 4-6 members identified under Team Roles

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- Perform hand hygiene and wear appropriate PPE
- Call time-out by RN Lead
- Verify patient using correct identifiers
- Remove patient's gown, EKG leads and electrodes. The SpO2 monitoring and arterial line (if any) can be used to monitor patient's cardiopulmonary status.
- Remove patients pillow and position hands on patient's neck/occiput and ET tube by (RT)
- Turn patient from side to side to tuck patients' hands under buttocks bilaterally
- Boost the patient up to the top of the bed on the RT's three-count prompt.
- Place pillows on top of underpads in the horizontal position on the patient's chest, pelvis and knees (*Figure 3*)



Figure 3: Protective pillows on bony prominences

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- Place a flat sheet/Positioning Pads on top of everything, Accordion fold top of sheet under patient's neck
- Roll top and bottom sheets tightly together, encasing the patient like a "burrito". (*Figure 4*)



Figure 4: "Burrito" wrap

- Move patient horizontally to the edge of the bed farthest away from the ventilator on the RT's three-count.
 - Tuck the rolled sheet farthest away from ventilator under the patient
 - Loop the ventilator tubing above the patient's head.
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- Rotate the patient 90 degrees to side lying position, with the ET tube facing the ventilator on the RT's three-count. Continue to turn patient full 180 degrees by team opposite the vent grabbing the top of the burrito roll and the ventilator side team grabbing the bottom of the roll away from the ventilator on the RT's three-count.
- Adjust and center the patient in the bed. Unroll sheet and discard top sheet and chux (if any)
- Snug sheets on RTs three-count prompt to prevent potential for skin breakdown
- Place the patient flat and pull the sheet or Positioning Pad through so that it is under patient
- Remove stat lock tape from indwelling catheter and place on the back of the patient's thigh
- Flatten sheet under patient
- Discard the sheet that was used to place the patient in the supine position.

E. Post-Maneuver Phase

- Assess patient
- Correctly position all tubes, drains, and lines.

- Attach the ECG leads to the electrodes on the patient's back. (*Figure 5*)
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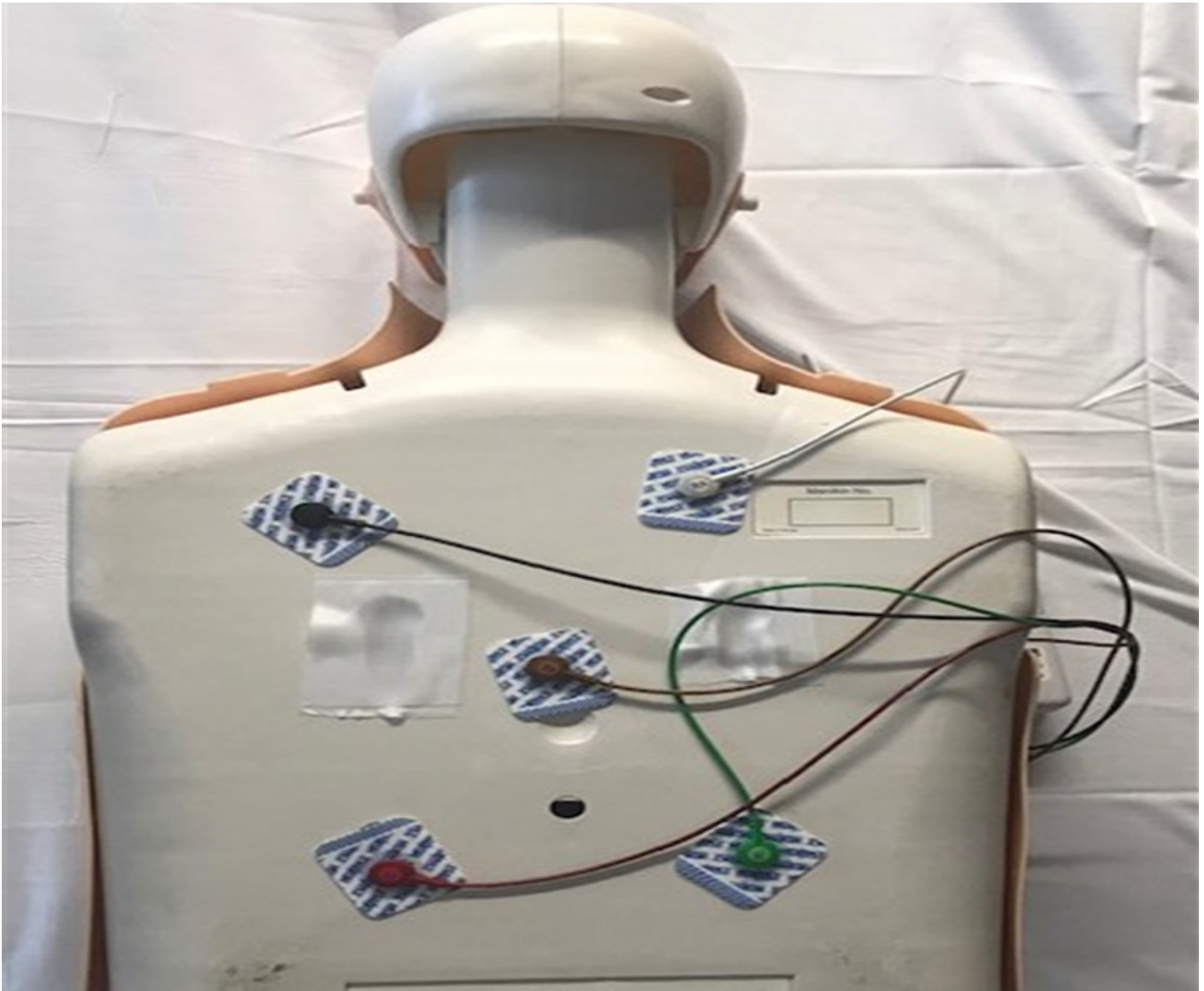


Figure 5 (Lead placement: prone position)

- Rest patients head to one side, using a **Positioning pad**, or donut pillow and support evenly with the neck in neutral position.
 - Check ear facing mattress is not compressed or folded
 - Place pillows or Positioning Wedge 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.
 - Adjust the bed to place the patient in reverse Trendelenburg position.
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- Level and zero invasive monitoring equipment (if applicable)
- Place new gown over on patient if desired and resume sequential compression device.
- Check genitals of male patients and breasts of female patients to make sure they are not compressed
- Remove stat lock tape from indwelling catheter and place on the back of the patient's thigh
- Position patients arms into swimmer's position (place opposite arm from ET tube location upward and the other arm remains downward. Modify this position every 4 hours with the RT managing the head turn (*Figure 6*)



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Figure 6: Swimmers Position

- Adjust bed inflation as appropriate.
 - Activate the lateral rotation of the bed (if available), or offload pressure points.
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- Decrease FIO2 to previous settings prior to pronation
- Resume tube feedings to rate prior to pronation
- Label patients monitor “**PRONE**” at the central station
- Discard supplies, remove PPE, and perform hand hygiene.

F. Ongoing Assessment, Evaluation and Documentation Phase

- Assessing patient’s tolerance and response
 - Maintain prone position for 16 hours daily
 - Restore to the supine position for 8 hours daily
 - Assess the patient for a sustained improvement in gas exchange (e.g., >10 mmHg PaO2 on stable ventilator settings) or evidence of alveolar recruitment (e.g., increase in lung compliance based on a fall in plateau pressure for a given tidal volume).
 - Assess patient’s tolerance to tube feeding as appropriate. Request for prokinetic agent if indicated
 - Perform oral care and ET suctioning every 4 hours (Continue maintaining VAP bundle)
- Document the procedure and assessment in the EPIC.
 - Physician order for pronation, mechanical ventilator settings, vasopressor (if indicated) with parameters, sedation and paralytic medications with parameters (refer to Epic order set)
 - Nursing documentation include:
 - Patient ability to tolerate turning procedure
 - Length of time in prone position, tolerance or intolerance
 - Hemodynamic response or events during pronation therapy position
 - Patient and family education
 - Skin assessment
 - Changes in position (swimmers)

G. Turning the Patient from Prone to Supine Manually Using a Sheet or Positioning Pads

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- Follow steps on **Maneuver Phase**

 - Prepare the patient for the turn.
 - Turn the patient's head so that it was facing the ventilator.
 - Loop the ventilator tubing above the patient's head.
 - Place the patient's arms alongside of the body with the fingers pointing toward the feet.
 - Cross the patient's legs at the ankle, placing the foot opposite the ventilator on top.
 - Remove the ECG electrodes from the patient's back.
 - Fold down the top of the flat sheet or **Positioning Pads** that was under the patient's head.

 - Grab the top and bottom sheets together along both sides of the patient and tightly roll them up to the side of the patient sandwiching the patient firmly between the sheets.

 - Slide the patient to the side of the bed opposite of the ventilator.

 - Roll the patient over into the supine position following the three-count prompt of the RT, tightly hold the rolled-up sheets on each side of the patient.

 - Pull and center the patient in the bed.

 - Position all tubes, drains, and lines correctly

 - Attach the ECG leads to the electrodes on the patient's chest.

 - Place the patient's arms in a position of comfort.

 - Adjust the bed inflation as appropriate.

 - Adjust the bed to place the patient in the semi-Fowler position.

 - Resumed the tube feeding if appropriate

 - Discard supplies, removed PPE, and performed hand hygiene.

 - Follow steps on **Ongoing Assessment, Evaluation and Documentation Phase**
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