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| **Huron Perth Healthcare Alliance** |
| **1. Clinical Policies and Procedures** | Original Issue Date:  | September 21, 2018 |
| **Pronation Therapy** | Review/Effective Date:  | September 21, 2018 |
| **Approved By: VP People and Chief Quality Executive** | Next Review Date:  | September 21, 2020 |

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| **Scope:**This policy applies to all Nurses and Respiratory Therapists (RRTs) who have received the appropriate theoretical and practical preparation to initiate, monitor and provide care for patients for whom pronation therapy has been ordered at the Huron Perth Healthcare Alliance (HPHA). |
| Physiotherapists and Physiotherapy Assistants need to be aware of this policy as they may be involved in the treatment of a patient undergoing pronation therapy.**Policy Statement:**This policy and procedure describes the essential steps involved with the initiation, monitoring and care of patients requiring pronation therapy. |
| **Purpose Statement:**The purpose of this policy is to provide guidelines for the Nurses, RRTs, Physiotherapists and Physiotherapy Assistants and their managers at the HPHA related to the care of patient requiring Pronation Therapy. It is expected that all staff shall adhere to the principles outlined in this policy. |
| **Definitions:****Acute Respiratory Distress Syndrome (ARDS)***:* an acute diffuse, inflammatory lung injury leading to increased pulmonary vascular permeability, increased lung weight and loss of aerated lung tissue with hypoxemia and bilateral radiographic opacities associated with increased venous admixture, increased physiological dead space and decreased lung compliance ARDS is categorized as being mild, moderate or severe

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| **Severity** | **PaO2/Fi02( P/F ratio)** |
| Mild | 200-300 |
| Moderate | 100-200 |
| Severe | Less than 100 |

*P/ F ratio:* PaO2/FiO2 ratio is the ratio of arterial oxygen partial pressure to fractional inspired oxygen To calculate : PaO2 83 FiO2.4583 divided by 0.45 = 188 (Moderate ARDS)***Endotracheal Tube (ETT*** a tube that is inserted through the mouth or nose into the trachea for the primary purpose of establishing and maintaining a patent airway and to ensure the adequate exchange of oxygen and carbon dioxide.**Pronation therapy**: 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. This therapy can be used to facilitate the mobilization of secretions and provide pressure relief, and it improves oxygenation and mortality in patients with ARDS |

**Competency Requirements:** Nurses having appropriate theoretical preparation and understanding of the underlying condition for which this treatment is proposed and having demonstrated the appropriate knowledge, skills and judgement may perform this treatment on the order of a physician.* A nurse and/or Respiratory Therapist will have been deemed to have the appropriate theoretical and practical preparation (hands-on demonstration in ICU) once the following competency requirements have been met.
* Physiotherapists and Physiotherapy Assistants will not be involved in the provision of pronation therapy although may be involved in the treatment of a patient receiving pronation therapy.

**Indications:**Indicated for patients diagnosed withmild, moderate or severe ARDS, as diagnosed and ordered by a physician. **Contraindications:*** raised intracranial pressure
* hemodynamic instability
* massive hemoptysis
* tracheostomy or tracheal surgery
* severe facial trauma
* unstable C-spine
* new pacemaker insertion (within 2 days)
* pregnancy
* rib fractures
* anterior chest tube with air leak
* open abdomen/recent abdominal surgery
* weight greater than 160 kg (relative contraindication)

**Considerations:*** Patients are deeply sedated and usually paralyzed with neuromuscular blocking agents.
* Preparations for feeding should be addressed prior to pronation therapy:
	+ Obtain an order to insert a small bowel feeding tube. Gastric placement of the feeding tube is acceptable if unable to insert small bowel feeding tube.
	+ If enteral feeding is contraindicated, review the need for total parenteral nutrition (TPN).
	+ If pronation therapy is required urgently, initiate feeding when repositioned supine.
* Cardiac Arrest in Prone Position:
	+ It is best not to attempt to turn the patient immediately, because the risk of losing the airway or vascular access outweighs the benefit of immediate supine positioning. **Remember the patient is intubated and has venous access.**
	+ Chest compressions can be done in the prone position using standard ACLS protocols.
* Prone CPR: (**NOTE:** CPR can be performed on the patient’s back as can defibrillation and pacing. It is safer to do so in an emergency situation and without the experienced human resources to return the patient to the supine position.)
	+ Emergency deflate the bed and remove pillows
	+ Place hand under the patient at the sternum to landmark or place CPR board under patient if not on a hard surface.
	+ Place the other hand on the spine directly opposite the sternum.
	+ Commence compressions using the hand on the spine.
	+ Turn the patient supine if you cannot achieve CPR goals in the prone position and if you have adequate experienced human resources to do this safely.
* Prone Defibrillation:
	+ Place ZOLL multifunction(ONE STEP ZOLL PAD) pads on back and defibrillate/pace as required.

**Procedure Chart:**

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| **Procedure**  | **Rationale** |
| Equipment:* Minimum of 5 Staff members
* 4 pillows
* 2 lifter sheets
* 2 bed sheets: one under the patient and one on top of the patient
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| **The following steps shall be followed for initiation of pronation therapy:** |
| **Review physicians order.** * Identify indications, goals for pronation therapy with the physician.
* Physician to assess risk/benefit
* Review any contraindications

**Assemble Personnel:*** **A minimum of 5 staff members** is required to prone a ventilated patient:
	+ The “Airway Manager” RRT at the head of the bed and 2 staff members on each side of the bed.
	+ Additional staff members may be required if the patient is very large or has complex lines and tubes. During turning, the RRT responsible for the airway provides the team direction regarding when to turn.
	+ Don appropriate PPE.

**Perform a Safety Pause:*** With the team assembled, complete the Pre-Turn checklist (Appendix A).
* Review emergency response and ensure appropriate personnel and equipment are available prior to turning. Be aware of risk of:
	+ Accidental extubation ( have reintubation equipment available and bag valve mask)
	+ Accidental loss of other lines and tubes.

[Appendix A: Pre-Turn Checklist](https://intranet.hpha.ca/myalliance/doc.aspx?id=6728)**Prepare the Patient*** Set up and connect the End Tidal CO2 monitor.

If the patient is on a low air-loss surface, inflate it to the maximum level to make turning easier. Turn the patient to one side and apply ECG leads to the patient’s back. When finished, **Remove all chest electrodes*** Examine patient’s chest to identify areas vulnerable to pressure (e.g. subclavian, jugular lines). Reposition all lines and tubes that are located above the patient’s waist straight upward toward the head of bed. Reposition all lines and tubes that are located below the waist (e.g. Bladder catheter, femoral lines, fecal drainage systems and chest tubes) straight down toward the foot of the bed.
* RRT is to evaluate ETT securement and identify ETT distance marking **at the teeth** prior to turning.
* Place pillows; one across chest just above level of axilla, one across pelvis, one across thighs and one across shins.
* **Positioning Limbs for turning**; Turn patient in a prone position with their face looking in the direction of the ventilator.

**Arms:** position arms along the side of the body with fingers pointing toward toes; keep arms as close to the body as possible.**Feet:** While patient is supine, cross feet at the ankles by placing the foot **OPPOSITE** to the ventilator on top. * Cover Patient with Linen; Place 2 lift sheets over the patient’s chest and midsection. Cover the lifter and entire patient with a sheet. The sheet should cover from the head to foot of the bed. Fold the section of the sheet that is above the shoulders so that the patient’s head is not covered up.
* **Sandwich Patient between Sheets**: Grab both the top and bottom sheets together along both sides of the patient. Tightly roll the sheets together like a jelly roll to sandwich the patient firmly between the sheets. (head is exposed)
* **Slide Patient away from ventilator**: slide the patient to the side of the bed away from the ventilator.

**Conduct First Turn**: * Maximum inflate the bed surface. The “Airway Manager” is responsible for determining when to turn.
* Prior to turning, review the expectations for when to turn. (for example “we will turn when I say 3 in a 1,2,3 count”).

Review the plan for the turn as follows:* Log roll using spinal precautions
* Hold tightly onto jellyroll at each side to secure patient
* Turn patient onto side only
* Following the turn, the airway manager is to adjust ETT and tubing in preparation for the final turn

**Complete the Pronation:*** The “Airway Manager” is responsible for determining when to turn.
* Prior to turning review the expectations for this second turn.

Review the plan for the turn as follows;* Slowly turn the patient prone
* Hold tightly onto jelly roll at each side to secure patient
* “Airway Manager” to provide feedback on speed of turn according to airway needs
* Support ETT
* Maintain neck alignment

**Assess Airway**: following prone positioning RRT to reassess:* ETT distance **at the teeth**
* Presence of cuff leak
* Pressure points around ETT and securement device
* Check for any kinks in tubing
* Breath sounds and ventilator parameters

**Optimize Position:** Adjust the patient to minimize risk for both pressure injuries and nerve entrapment.Optimal prone position placement will include:* Place bed in reverse Trendelenberg if possible
* tubes or devices routed appropriately away from under the patient
* No ECG electrodes on chest
* Eye moisture and lids closed at all times
* Pressure relief for knees
* Feet should be maintained in dorsiflexion (ankle at 90 degrees, no downward toe pointing)
* For large breasted women, position breasts laterally to reduce pressure on nipples/breast tissue
* Male genitalia should hang freely, pillow helps to raise pelvis
* Foley positioned between legs
* Shoulder should be relaxed and dropped below chest; avoid shrugging position as this can lead to frozen shoulder/brachial plexus injury
* Protect against ulnar nerve injury by using the swimmer’s crawl position.

Complete the Post-Turn checklist.[Appendix B: Post-Turn Checklist](https://intranet.hpha.ca/myalliance/doc.aspx?id=6727)**Patients who are proned for ARDS will be maintained in a prone position for 16 hours before supination.** | The contraindications listed above can make patient care more difficult or may potentially complicate another more serious clinical problem. Decisions to initiation pronation therapy should be made on a case by case basis. If the decision to prone in the setting of a potential contraindication clinical documentation by the physician is required.Smooth repositioning is accomplished by careful planning.

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End tidal C02 monitoring will assist with early recognition of ETT dislodgement during the prone positioning. (Standard of Care)Fig. 1ECG electrodes, chest tubes, and central venous lines can lead to significant skin breakdown if the patient lies on them.Repositioning of all the lines and tubes prevents the lines from getting tangled or from getting caught underneath the patient (where they can cause skin breakdown)The pillows help to raise the patient off the bed and provide pressure relief; raising the chest and pelvis relieves tension from the abdominal viscera and may help improve ventilationThese positions protect the arms from injury and make turning easier.The top linen will become the new bottom linen following proning. This linen will facilitate turning and make the bed in the same step. Sandwiching the patient between the sheets helps maintain alignment and protect limbs during turning. The “jelly rolls” help facilitate turning while keeping patient secure.The patient will be turned to face the ventilator. This provides the most “slack” for the ventilator tubing. Moving the patient away from the ventilator ensures sufficient bed surface for pronation.By taking a moment to review the steps, all members of the team have the same expectation. This ensures both patient and staff safety and makes the process much more efficient.ETT may have moved during turning; optimal head and neck alignment; repositioning helps to distribute edema fluid, alleviate pressure points and assess patient for areas of risk.

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| Pressure points |

 You should be able to slide a hand under the patient’s abdomen. |
| **The following steps shall be followed for maintenance and care of the patient for the duration of the pronation therapy:** |
| * 1. Maintain reverse Trendelenberg during pronation therapyIf reverse Trendelenberg cannot be maintained, obtain an order to insert a gastric drainage tube and connect to suction if needed.

2. Obtain order to insert Fecal Management system and administer laxatives to keep bowel movements liquid3. Ongoing assessments and care:* Ensure patient is deeply sedated ( RASS -5) and has adequate neuromuscular blockade.
* Ensure pressure relief of areas surrounding vascular devices and tubes
* Reapply eye moisture as needed and ensure that lids closed at all times

4. Repositioning:* The ETT position should be assessed at the teeth with every change in patient position
* The patient’s head must be turned from side to side every 2 hours. Edema will settle in dependent areas and can lead to symmetrical facial swelling, swelling of the eyes and eyelids and periorbital region.
* Provide pressure relief for knees
* Feet should be maintained in dorsiflexion (ankle at 90 degrees, no downward toe pointing)
* Alternate arm positions; dropping the arm below the bed surface (e.g. on padded bedside table) can help relax shoulder- this can be done one arm at a time;
* A swimmer’s crawl position (one arm above head and opposite arm at side) can be tried.
 | Gastric drainage may be impaired in pronation therapy particularly if reverse Trendelenberg cannot be maintained. Gastric secretions are produced on an ongoing basis. If a patient is prone and flat (or head down) there is an increased risk for aspiration.This will facilitate bowel movement through the fecal management system.Patients with moderate to severe ARDS are deeply sedated and paralyzed during proning. Paralysis increases the risk for joint, limb and nerve injury due to altered neuromuscular stability. Patients on neuromuscular blocking agents should be treated like a spinal cord injured patient and need proper spine and limb alignment.During pronation pressure points must be altered with head turning, tilting, limb adjustments etc. q2hSignificant lip, face and airway edema can occur during prone positioning. |

**Related Resources:**HPHA Policy & Procedures: * [End Tidal C02 Monitoring](https://intranet.hpha.ca/myalliance/Default.aspx?cid=9034&lang=1)
* [Pressure Ulcer Prevention and Management Protocol](https://intranet.hpha.ca/myalliance/Default.aspx?cid=9135&lang=1)

eTRAIN elearning:* [Neuromuscular Blockade Agents (NMBA)](https://elearn.hpha.ca/enrol/index.php?id=153)

Elsevier Modules:* [Patient Positioning: Supine or Prone](http://mns.elsevierperformancemanager.com/SkillsConnect/Default.aspx?Token=1046880&SkillID=668)
* [Pronation Therapy](http://mns.elsevierperformancemanager.com/SkillsConnect/Default.aspx?Token=1046880&SkillID=32)
* [End-Tidal Carbon Dioxide Monitoring](http://mns.elsevierperformancemanager.com/SkillsConnect/Default.aspx?Token=1046880&SkillID=10908)

**References:**All images retrieved from Google ImagesChecking all the right boxes: the development of a checklist for prone positioning of the adult critical care patient. Retrieved from<https://www.caccn.ca/fr/files/P17checking> Claude Guerin, M.D., et al. (2013). Prone positioning in severe acute respiratory distress syndrome. New England J Med; 368:2159-2168 June 6,2013.Elsevier. (2020). Pronation Therapy module. Grand River Hospital Clinical policy prone positioning in Critical Care Mar. 13, 2018London Health Sciences Critical Care Trauma Centre, London, ON 2016.[http://www.lhsc.on.ca/Health Professionals/CCTC/Procedures/proning.htm](http://www.lhsc.on.ca/Health%20Professionals/CCTC/Procedures/proning.htm)Vollman, K. M. & Powers, J. (2011). Pronation therapy. D. Lynn-McHale Wiegand (Ed.), *AACN Procedure Manual for Critical Care 6th Edition (*pp.129-149*).* St. Louis, Missouri: Elsevier   |

 **Pronation Therapy Policy – Appendix A**

**Pre Turn Checklist**

* Inclusion criteria and contraindications reviewed
* Procedure risks/benefits explained to patient and/or Substitute Decision Maker
* Minimum of 5 staff members: RRT at head of bed as “Airway Manager” and 2 staff on each side of bed
* Gather pillows (4), 2 lift sheets and 2 bed sheets
* Perform Hand Hygiene and don PPE if required
* Assess patient’s hemodynamic status
* Ensure adequate sedation/analgesic/neuromuscular blockade
* Assess patient for presence of wounds. Change any dressing and empty ostomy bag if present.
* Lubricate, patch and tape eyes.
* Suction orally and ~~per~~ via ETT
* Secure ETT: identify distance measurement at the teeth
* Place enteral feed on hold and ensure tube is secure
* Reposition all tubes and lines that are located above patient’s waist straight upward toward head of bed
* Reposition all tubes and lines below the patient’s waist down toward the foot of the bed
* Cap off any lines that can be or add extension tubing
* Turn patient to one side and apply ECG electrodes to the patient’s back and remove all chest electrodes
* Prepare anticipated medications
* Pre-oxygenate patient
* Maximum inflate the bed
* Perform a **safety pause prior to turn** and review the procedural steps

 **Pronation Therapy Policy – Appendix B**

**Post-Turn Checklist**

 Assess ETT distance at the teeth

 Assess endotracheal tube for cuff leak

Assess for pressure points around ETT and securement device

 Assess for any kinks in ventilator or intravenous tubing

 Assess breath sounds and review ventilator parameters

 Place bed in reverse trendelenberg

 Q2h head repositioning

o ears not kinked

o face repositioned

o eyes lubricated and taped

 Feet should be maintained in dorsiflexion

 Foley positioned between legs

 Patient not lying on tubes or devices

 Reposition Arms

o Swimmer’s crawl

o Shoulder should be relaxed and dropped below chest

o Elbow below axilla

 Position breasts laterally to reduce pressure on nipples/breast tissue

 Male genitalia should hang freely

 Restart enteral feeds

 Ongoing assessment and pressure relief of vascular devices and tubes

 Clear oral and ETT secretions

 Documentation of all interventions and assessments