Rationale:

Prone positioning of the patient with acute respiratory failure can increase pulmonary capillary perfusion and oxygenation. The physiologic changes (fluid shifting from the posterior lung, allowing undamaged alveoli to be filled with oxygenated blood) that occur when a patient assumes a prone position improve ventilation. Prone positioning expands the dependent lung areas. Expanding dependent lung areas opens collapsed alveoli, increasing ventilation capacity and improving oxygenation.

Work of breathing can also be reduced with prone positioning because it reduces the pressure on the lungs from the cardiac structures and abdominal organs. Reducing work of breathing saves vital energy that the patient can use for healing and recovery.

Prone Position considerations for the non-intubated awake patient:

Prone an awake patient may be used with frequent monitoring. This should be considered early in the diagnosis of severe hypoxemia and the following situations:

1. Isolated hypoxemic respiratory failure without substantial dyspnea (the “paradoxically well appearing” hypoxemic patient). A reasonable candidate might meet the following criteria:
   a) not in multi-organ failure
   b) expectation that patient has a fairly reversible lung injury and may avoid intubation
   c) no hypercapnia or substantial dyspnea
   d) normal mental status, able to communicate distress
   e) no anticipation of difficult airway
2. Patients who do not wish to be intubated (DNI). The main risk of awake proning is that it could cause excessive delays in intubation. In the DNI patient who is failing other modes of ventilation, there is little to be lost by trialing awake proning.

3. This could be attempted as a stop-gap measure (Rescue Therapy) for a hypoxemic patient when intubation isn’t immediately available (e.g. desaturation during transportation). Many awake patients are capable of proning themselves, so this could be achievable without any resources.

**Contraindications:** (Determine if the risks of prone positioning are outweighed by the patient's need for improved oxygenation)

| Considerations: |
|-----------------|-----------------|
| • Extreme Obesity* | • Advanced Pregnancy* |
| • Spinal Instability | • Delirium and confusion |
| • Abdominal or chest wounds | • Inability to independently change position |
| • Ophthalmic surgery | • Recent nausea / vomiting |
| • Intraocular pressure | • Multi-organ failure |
| • Hypercapnia | |

*Patients with body habitus that inhibits full proning should be encouraged to “prone” as far as they are able.

**Equipment:**

- Pillows
- Supplemental oxygen
- Continuous O2 monitor
- Foam dressings for pressure points

**Timed position changes:**

- If patient fulfills criteria for proning ask the patient to switch positions as follows. Monitor oxygen saturation after every position change to ensure oxygen saturation has not decreased.

**Pre-Positioning Skin Integrity Assessment and Pressure Injury Prevention**

1. Apply soft silicone multilayer foam prophylactic dressings to bony prominences, chin, cheeks and forehead to assist in the avoidance of hospital acquired pressure injury.
2. Assess all pressure points prior to proning.
   i. Apply soft silicone multi-layered foam prophylactic dressings to pressure points (patella, pretibial areas, cheeks, etc.).
   ii. Apply thin foam dressing under medical devises.
   iii. Avoid multiple layers of dressings or linen that increase pressure.
3. Choose correct size medical devices to fit the patient.
5. Avoid device placement over sites of prior or existing pressure injury.

**Proning details:**

<table>
<thead>
<tr>
<th>Nursing Action</th>
<th>Special Considerations</th>
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</thead>
<tbody>
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<td></td>
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</tbody>
</table>

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### Assessment:
1. Assess mobility
2. Assess mental status
3. Evaluate for contraindications and considerations
4. **Skin Assessment**

Prior to being encouraged to adopt the prone position, the patient should be assessed for the ability to independently change position in bed.

**Refer to pressure injury prevention guidance below.**

### Preparation
1. EKG leads may be moved to the back for comfort.
2. SPO2 probe (continuous) should be placed on the patient if not already in use.
3. Ensure medical devices are not under patient when proning. (e.g., Tele-pak, O2 tubing, Foley tubing, etc.)

To minimize interruptions during prone positioning, have the patient consider physiologic needs and comfort strategies prior to prone position, if possible (e.g., toileting, nutrition, medications, call bell within reach, phone or other device in reach, utilizing music or television as a distraction, etc). Consider EKG leads as a potential pressure point for pressure injury risk.

### Timing
1. On admission, a patient experiencing respiratory symptoms or requiring supplemental oxygen should receive a period of prone positioning, **up to 1 hour or as tolerated.**
2. EKG monitoring should remain in place. Leads may be moved to back and ensure that tele-pack is not under the patient.
3. In the prone position, the patient should lie on his/her stomach, supported by their arms and a pillow in such a manner that oxygen supply tubing is not obstructed.
   a. An alternative to the arms supporting model is on his/her stomach supported by pillows with the head of bed slightly raised.
4. Pillows placed under the hips, or under legs as needed for comfort.
5. Prevention of pressure injury with foam dressings on pressure points, slight repositioning and pillow support is needed.
6. After initial period, the patient can reposition themselves to supine but should be encouraged to adopt the prone position as often as tolerated and able. The goal should be for the patient to be in the prone position more often than not while in bed. Ideally, prone positioning should be maintained for 12 -

### Documentation
Patient's SpO2, oxygen device, L/min of O2, respiratory rate and effort should be assessed and documented, just prior to proning and 1 hour after proned.

*from Sun et. al*³

![Proper positioning on the stomach](image-url)
16 hours per day at whatever interval the patient can manage.

<table>
<thead>
<tr>
<th>Monitoring patient during proning</th>
<th>Pressure points associated with prone positioning:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Once positioning is achieved, check for uneven distribution of pressure and positioning of medical devices. Pay particular attention pressure points listed in #5.</td>
<td><img src="https://cdn.ymaws.com/npiap.com/resource/resmgr/press_releases/npiap_pip_tips_-_proning_202.pdf" alt="Pressure Points" /></td>
</tr>
<tr>
<td>• Confirm that medical devices (e.g. tele-packs) are not placed underneath patient.</td>
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<tr>
<td>• Ensure pressure points are padded and place pillows strategically to avoid pressure injury.</td>
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<tr>
<td>• Carefully place limbs, keeping in mind the goal of preventing extension and contraction of shoulders or elbows.</td>
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<tr>
<td>• <strong>Assess skin integrity frequently</strong> as these patients are at higher risk for pressure injuries, especially the face and the anterior chest wall.</td>
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<tr>
<td>o To reduce this risk, use soft silicone multilayer foam prophylactic dressings on bony prominences, such as the forehead, chin, and shoulders.</td>
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</tr>
<tr>
<td>o Reposition the patient at least every 2 hours to redistribute pressure and reduce friction.</td>
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<tr>
<td>o Repositioning the head every hour and providing ocular and eyelid protection can help reduce skin breakdown.</td>
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<tr>
<td>o Pressure Points</td>
<td></td>
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<tr>
<td>▪ Forehead</td>
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<tr>
<td>▪ Chin</td>
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<td>▪ Cheeks</td>
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<td>▪ Nose</td>
<td></td>
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<tr>
<td>▪ Clavicle – shoulders</td>
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<tr>
<td>▪ Elbows</td>
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<tr>
<td>▪ Chest – breasts</td>
<td></td>
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<tr>
<td>▪ Genitalia – penis</td>
<td></td>
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<tr>
<td>▪ Anterior pelvic bones (iliac crests, ischium, symphysis pubis)</td>
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</tr>
<tr>
<td>▪ Knees – patella</td>
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<tr>
<td>▪ Dorsal feet, heels and toes</td>
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<tr>
<td>▪ Under and around Medical Devices</td>
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<tr>
<td>• The patient should never be placed face down.</td>
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</tr>
<tr>
<td>• Document all skin assessments and preventive measures</td>
<td></td>
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</tbody>
</table>
**Prone Position as Rescue therapy**

1. It is important to involve the medical team before attempting prone positioning as a rescue therapy.
2. A patient who develops increasing oxygen need (an increase of >2L/min needed to maintain an SPO2>90%) is at risk for respiratory failure.
3. If the patient is in the supine position, and it is safe to do so, place the patient in the prone position.
4. Notify the medical team of continued worsening hypoxemia.
5. If the patient stabilizes (decreased RR, increased SPO2, decreased O2 need) reassess frequently.

**Documentation**

At the time of the event,
- O2 L/min
- O2 device
- Resp rate
- SPO2

Medical Team should be encouraged to establish parameters for saturation goals for patient.

Additional information:

1. Prone positioning has no effect on PaCO2, pH, respiratory rate, or hemodynamics.
2. There is often an initial decline in oxygenation with position change and after return to the supine position.
3. Frequent assessment of toleration is required
   a. Close monitoring of patients with co-morbidities that predispose them to rapid deterioration.

**Resources:**

1. Massachusetts General Hospital, Version 1.0 04/02/2020, Copyright 2020, publicly available content.
5. Sun, Q., QUI, h., Huang, M., Yang, Y., Lower mortality of COVID-19 by early recognition and intervention: experience from Jiangsu Province. Ann. Inntensive Care 10;33
6. Nursing Critical Care 2020: [https://journals.lww.com/nursingcriticalcare/Fulltext/2012/03000/Prone_positioning_for_patients_with_ARDS.6.aspx](https://journals.lww.com/nursingcriticalcare/Fulltext/2012/03000/Prone_positioning_for_patients_with_ARDS.6.aspx)
7. Proper positioning on stomach photo courtesy of: myshepherdconnection.org