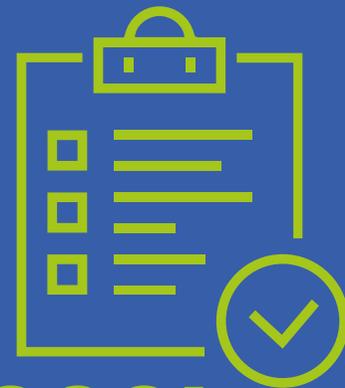


PRONETECT  
EDUCATION



**PROTOCOL**

**Skin/Tissue Damage Prevention  
for the Critically ill Patient  
in the Prone Position**

# ABBREVIATIONS

<b>ARDS</b>	Acute respiratory distress syndrome
<b>ECMO</b>	Extra-corporeal membrane oxygenation
<b>ETT</b>	Endotracheal Tube
<b>IAD</b>	Incontinence-associated dermatitis
<b>MASD</b>	Moisture-associated skin damage
<b>MDR-PI</b>	Medical device-related pressure injury
<b>PaO<sub>2</sub>/FiO<sub>2</sub></b>	Ratio of partial pressure of arterial oxygen to fraction of inspired oxygen
<b>PP</b>	Prone Position(ing)
<b>RT</b>	Respiratory Therapist

## NOTE

*This protocol is based on expert opinion and the current literature at the time of publication.*

*The protocol should be adapted to local procedures, policy and legislation and updated according to facility-specific device availability and the unit-specific safety focus.*



## INDICATIONS

- Early prone positioning when adequate oxygenation cannot be reached
- Moderate to severe ARDS with PaO<sub>2</sub>:FiO<sub>2</sub> ratio < 150mmHG and FiO<sub>2</sub> > 0.6 and positive end expiratory pressure [PEEP] > 5 cm H<sub>2</sub>O
- Ideally within 36 hours of onset of ARDS and following 12-24 hours of supine ventilation allowing for treatment optimization



## CONTRA-INDICATIONS

- Absolute:
  - » Spinal instability
- Relative:
  - » Open chest post cardiac surgery/trauma
  - » < 24 hours after cardiac surgery
  - » Central cannulation for veno-arterial ECMO (extra-corporeal membrane oxygenation or BiVAD support (Biventricular Assist Device))
  - » Multiple Trauma e.g., pelvic or chest fractures, pelvic fixation device
  - » Severe facial fractures
  - » Head injury/Raised intracranial pressure
  - » Frequent seizures
  - » Raised intraocular pressure
  - » Recent tracheostomy

---

**PRONE POSITION/REPOSITION PROTOCOL:**

Skin Protection Strategies

---

1



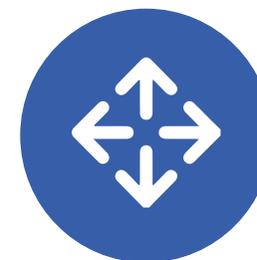
PREPARE  
**THE TEAM**

2



PREPARE  
**THE PATIENT**

3



**REPOSITION**



# 1 PREPARE THE TEAM

---

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies

---



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



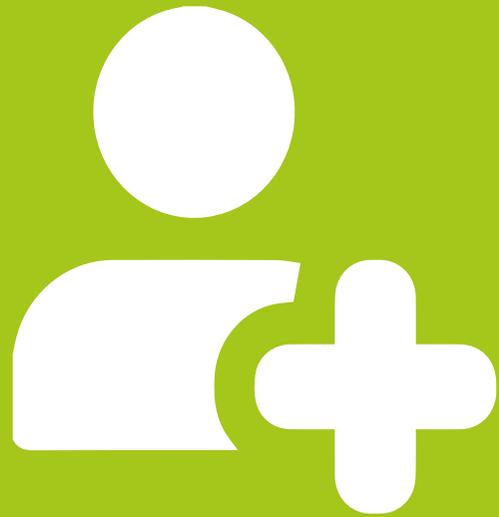
#### REPOSITION

#### Receive Doctor's order to prone the patient

- Notify the multidisciplinary team who are skilled in the prone manoeuvre
- Ensure an adequate number of team members are available (5-7)
- >5 members if ECMO or chest tubes or morbidly obese patient
- Assign a team leader
- Communicate the roles and responsibilities within the team
- One dedicated specialist for airway management
- No contra-indications for PP
- Procedure explained to family/ next of kin

#### PRONE Kits:

- Recommended to have pre-packed kits/packs with all the devices needed for PP readily available
- Include the checklist



**2 PREPARE THE PATIENT**

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



PREPARE THE TEAM

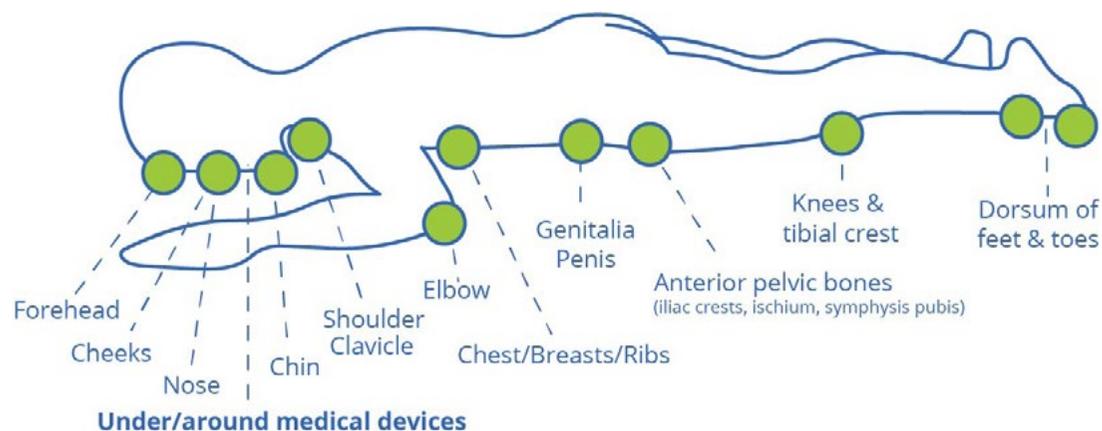


PREPARE THE PATIENT



REPOSITION

### High risk areas for skin/tissue damage



### Key concerns:

**Pressure points** for potential PU development

### Medical device-related PUs

- Endotracheal- and nasogastric tubes, catheters, etc.

### Moisture-associated skin damage (MASD)

- Prone positioning increases respiratory secretions (face and neck area)
- Incontinence-associated dermatitis (IAD)

### Medical adhesive-related skin injuries (MARSII)

### Skin tears

- Related to medical adhesives and potential trauma during patient repositioning

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



#### REPOSITION

#### Step-by-step procedure

1. Perform **patient hygiene**: Skin cleansing of the front side of the patient (follow unit protocol)
2. Do a full **skin assessment** during patient hygiene care and document after manoeuvre
3. **Moisturise** the skin with a pH-balanced moisturiser for prevention of **skin tears** and to promote skin health
4. Faecal incontinence: Prophylactically apply an alcohol-free liquid barrier product to all body areas expected to be exposed to **incontinence for protection against incontinence-associated dermatitis (IAD)** (link to **Video #01**)
5. Frequent, liquid diarrhoea:
  - a. Consult with the dietician on your multidisciplinary team. Other than pharmacological control, a faecal management system might be indicated
  - b. Consider applying an advanced skin protectant if the patient has frequent, liquid diarrhoea as the skin is then particularly at high-risk for IAD and skin erosion



*Note: Whilst the patient is in PP, the anterior areas (upper thighs, perineum) might also be exposed to bodily fluids.*

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies

#### Step-by-step procedure



PREPARE THE TEAM



PREPARE THE PATIENT



REPOSITION



HEAD:



#### 6. Nasogastric tube (NGT)

*Note: Consider placing an orogastric tube.*



- Foat the NGT with hammock taping technique or similar, to prevent **medical device-related pressure injuries (MDR-PIs)**(**Video #02**)
- a. Clean and protect skin
- b. Choose right type of tape
- c. Apply a securement technique which would not press the tube against the skin/ nostril of the patient

#### 7. Suction oropharynx and airway

#### 8. Endotracheal Tube (ETT) securement (**Video #03**)

- Perform oral care
- Note the length of the ETT at the teeth (top incisors) - lip size can change especially once prone
- Secure endotracheal tube (ETT) in the middle of the mouth with appropriate tape or ties/twill
- Commercial devices which can potentially cause more pressure in PP are not recommended
- If ETT ties are used, place a thin foam underneath or silicone foam strips around and under the ties

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



#### REPOSITION

#### Step-by-step procedure

- a. Ensure the skin is clean and free of debris
  - b. Use surgical clippers, not razors, to remove excess facial hair when tapes will be used to minimise superficial infection from micro-cuts to the skin and for tape to adhere optimally
  - c. Prophylactically apply an alcohol-free liquid barrier to all areas potentially exposed to secretions (around mouth, chin, neck) for protection against **moisture-associated skin damage (MASD)** and underneath the adhesive (tape) to prevent **medical adhesive-related skin injuries**
  - d. Select the right type of tape for safe securement (usually an acrylate-based adhesive with a strong backing like cloth)
  - e. Ensure the patient's tongue is positioned in the mouth and not pressing against the ETT
9. Perform **eye care (Video #04)**
    - a. Apply ophthalmic lubrication after cleansing
    - b. Close eyelids by applying microporous/silicone tape horizontally - eye lashes forward to prevent corneal abrasions/injuries
    - c. Take care with the removal of the tape to prevent **medical adhesive-related skin injuries (Video #07)**

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



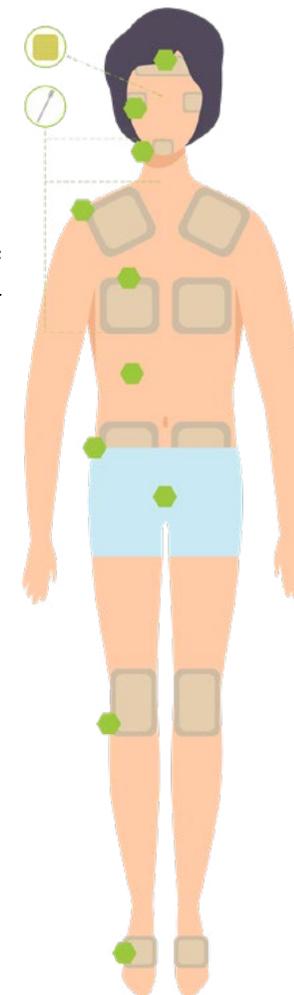
#### REPOSITION

### Step-by-step procedure



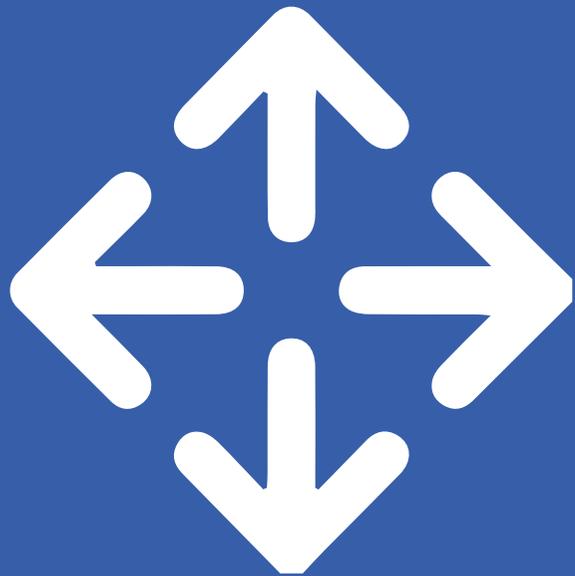
#### BODY:

10. Insure all **intravenous lines and drains** are well secured and clean dressings applied
11. Assess and change (if indicated) any **wound dressing** on the anterior side of the body
12. Perform **stoma care**, protect the surrounding skin. Evaluate if extra padding is necessary around the stoma bag (or other drains) for when the patient is in PP (**Video #05**) to redistribute pressure
13. **Protect bony prominences** and vulnerable areas (e.g., nipples) with soft silicone multi-layer foam dressings (**Video # 06**)
14. Ensure all needed equipment/devices are on-hand for the prone manoeuvre
  - Electrodes
  - Clean linen
  - *Note: Try to minimise placing "linen-savers"/absorbent sheets underneath the patient in PP as this can advertently effect the skin microclimate and predispose the skin to breakdown*
  - Absorbent pad for respiratory secretions
  - Unit specific or preferred devices e.g.,
    - » Head support: Fluidized positioner
    - » Turning and positioning equipment / sliding sheets
    - » Pressure redistribution pads, wedges, pillows





**3 REPOSITION**



## **3 REPOSITION**

**SUPINE-TO-PRONE MANOEUVRE**

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



PREPARE THE TEAM



PREPARE THE PATIENT



REPOSITION

#### Supine-to-Prone Manoeuvre

(Video # 00a)

Team: 5-7 People – the manoeuvre takes approximately 10-15 minutes when all preparations have been done.

*Nb! Emergency equipment should be on hand in case of accidental extubation*

- One specialist (e.g., respiratory therapist (RT), medical doctor...), should be dedicated to airway management standing at the head of the bed. Two members to stand on each side of the patient
- Assigned team leader will give the instructions to the rest of the team and communicate the direction the patient will be rotated; usually towards the ventilator
- It is preferred to have one of the prone team members to be hands-off to coordinate the procedure and monitor vital signs
- Note vital data right before prone positioning



---

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies

---



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



#### REPOSITION

#### Supine-to-prone Manoeuvre (Video # 00a)

1. Adjust bed height for staff safety and easy airway handling. Place the bed in a flat position and remove side rails and headboard
2. Airway manager (RT) to
  - a. Pre-oxygenate the patient with 100% oxygen
  - b. Ensure the ventilator circuit has enough length for the rotation (prevent accidental extubation)
  - c. Maintain the airway by holding the ET tube along with the mandible with one hand, and supporting the patient's neck with the other hand (ETT and neck to move in synchrony)
3. Lines and tubes
  - a. Ensure all lines and tubes above the patient's waist are positioned towards the head of the bed; lines below the waist are positioned toward the foot of the bed e.g., the urinary catheter towards the feet
  - b. Ensure enough slack of the lines, monitoring equipment and tubes



*Note: this procedure mentions sliding sheets and pillows. Refer to your unit's staff safety protocols for the preference and availability for advanced turning and positioning systems.*

4. Place a sliding sheet underneath the patient's current sheet and move it in underneath the patient as far as possible
5. Remove the patient's gown, ECG electrodes and leads and the urinary catheter's securement device/tape – this is to prevent **medical device-related pressure injuries** (MDR-PIs)

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



#### REPOSITION

#### Supine-to-prone Manoeuvre (Video # 00a)

6. Temporarily tape the arterial line's transducer to the side of the chest to continue pulse monitoring



*Note: if the ventilator is behind the head of the bed, not on the side - keep the radial arterial line "on top" and also move the transducer to the top of the bed.*

7. Tuck the patient's hand on the side of the ventilator, in underneath the buttocks. The palm facing up
8. Whilst in the horizontal position, place pillows on the patient's chest and pelvic girdle to decrease abdominal pressure; and pillows on the pre-tibial area to prevent **pressure areas** on the knees
9. Cover the patient completely with a clean top sheet, except for the head and neck and roll both top and bottom sheet edges together (burrito method) to encase the patient and keep pillows in place
10. RT to remove the pillow underneath the patient's head
11. Move the patient up to the head of the bed
12. Move the patient horizontally, furthest away from the ventilator, until the shoulder of the patient is at the edge of the bed
13. Rotate the patient 90 degrees on their side (side-vertical position), facing the ventilator
14. Whilst in the side-vertical position, slide the patient horizontally away from the ventilator
15. Complete the rotation into PP: The team members facing the ventilator, to gently pull the rolled-up sheets from beneath the patients and the other members carefully place the patient in PP

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



#### PREPARE THE TEAM



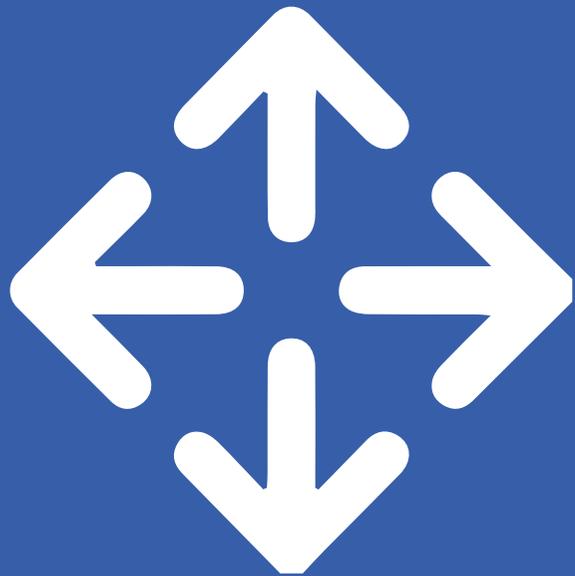
#### PREPARE THE PATIENT



#### REPOSITION

#### Supine-to-prone Manoeuvre (Video # 00a)

16. Centre the patient in the bed and remove the sliding sheet from underneath the patient. Straighten the bottom sheets removing any wrinkles which can cause **pressure areas**
17. Place ECG electrodes on the back of the patient and connect the leads
18. Ensure all infusions are running, unclamp urinary catheter. Check all lines, tubes, and drains
19. Position the head of the patient onto a specialised device designed for **pressure redistribution** e.g., fluidized positioner, or unit's protocol. Check that ears are not compressed
20. Mould the head positioner such that both eyes of the patient could be visible and facial bony prominences are offloaded
21. Place an absorbent pad underneath the patient's mouth to wick away the respiratory secretions
22. Check all high-risk areas for appropriate off-loading or **pressure redistribution**: do a 'free-hand' check underneath the patient's abdomen to ensure enough space between the support surface and body
23. Elevate the knees and feet with positioners and ensure the tips of the toes do not touch the support surface. Place the bed in reverse Trendelenburg position according to your unit protocol (usually 10-25 degrees) to reduce **facial oedema**
24. Place the bed in reverse Trendelenburg position according to your unit protocol (usually 10-25 degrees) to reduce facial oedema



# **3 REPOSITION SWIMMER'S POSITION**

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



PREPARE THE TEAM



PREPARE THE PATIENT



REPOSITION

#### Swimmer's position (Video #08)

To avoid brachial plexus injury:

1. Maintain straight spine alignment and avoid excessive arm rotation
2. Raise the arm on the same side as the head is facing; ensure that the 'up arm' **does not extend beyond 70 degrees** with elbow extension or external rotation of the shoulder beyond **60 degrees**
3. Avoid over-extension of the shoulders which could place abnormal pressure on the brachial plexus
  - a. Place support underneath the patient's chest for the shoulders to 'fall forward'
4. Other arm is placed next to/ alongside the body
5. Ensure that the neck is not hyperextended
6. Check the ETT and NGT to ensure there is no pressure on the mouth/lips or nares from these devices
7. Ensure ears are not bent over or compressed
8. If possible, bend the knee (on the side the head is facing) slightly upwards for spinal alignment



## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



PREPARE THE TEAM



PREPARE THE PATIENT



REPOSITION

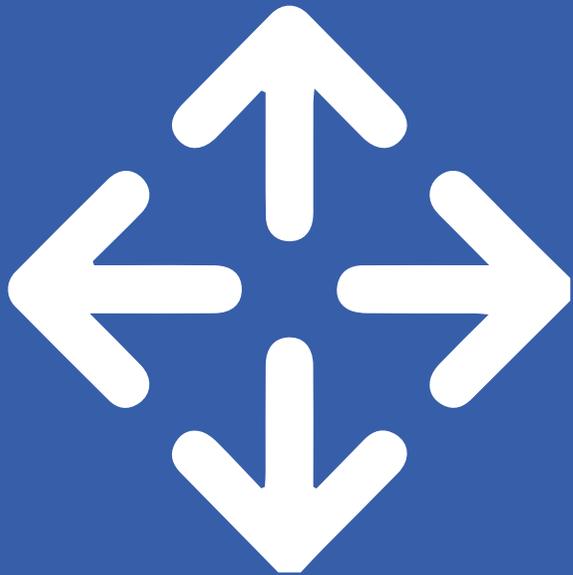
#### Swimmer's position (Video #08)

9. Ensure optimal positioning of pillows/wedges/positioners
10. Tips of toes not touching the support surface
11. Consult with the physiotherapists to check the correct positioning of the patient



**Bed position:** Reverse Trendelenburg position to decrease facial oedema (usually **10-25 degrees**, refer to your unit's protocol). If the degree of bed tilt is too high, it could cause major shear and frictional forces. Tilt the whole bed (reverse Trendelenburg position) and not only the head of the bed as this will cause abnormal spine alignment.

*Duration of prone session: approximately 16 hours; according to Doctor's orders*



**3 REPOSITION**

**HEAD AND BODY REPOSITIONING**

---

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies

---



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



#### REPOSITION

### REPOSITION HEAD and CHANGE BODY POSITION (Video #08)

Every 2-4 hours or as clinically indicated. Conduct body micro-shifts\* two hourly or more often if possible

\*micro-shifts or micro-positioning: frequent, small body changes to improve blood flow and pressure redistribution (see Video #08)

#### Head repositioning

- Move the patient up in the bed so that the head is floating off the mattress – RT rotate the head to the opposite side and the patient is then moved down in the bed again
- Pull the patient's chest upward, using the sheets

Repeat **swimmer's positioning** but with opposing sides and head rotated, facing the other side

- Change leg position as arm direction is changed
- Avoid arm hyperextension. Support head; neck in neutral position

Ensure positioners/pillows are in place under the chest and pelvis to reduce intra-abdominal pressure

---

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies

---



#### PREPARE THE TEAM



#### PREPARE THE PATIENT

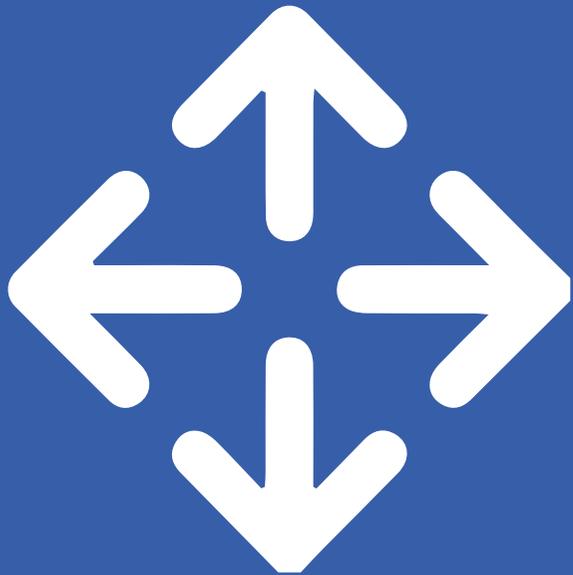


#### REPOSITION

#### Check

- ✓ Ensure eyes are free from direct pressure
- ✓ Monitor vulnerable areas on the face e.g., chin, nose, forehead
- ✓ Monitor tongue for oedema
- ✓ Check underneath ETT, monitor mouth for pressure damage
- ✓ Ensure ears are not folded or compressed
- ✓ Ensure medical devices are not causing pressure and shear; check surrounding skin
- ✓ Ensure that sheets/linen underneath the patient are free from wrinkles or folds
- ✓ Re-check bony prominences and vulnerable areas for correct position and padding
- ✓ Verify that genitalia are not compressed between legs and breasts off-loaded and protected

**Document skin assessment with each round; before and after prone sessions**



**3 REPOSITION**

**PRONE-TO-SUPINE MANOEUVRE**

---

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies

---



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



#### REPOSITION

#### Prone-to-supine Manoeuvre (Video # 00b)

 Note: Depending on the PaO<sub>2</sub>:FiO<sub>2</sub> ratio, the patient will be in supine position for up to 8 hours and then placed in prone position again. If the patient will be in the supine position for a longer period; consider placing a multi-layer silicone-adhesive dressing on the patient's sacrum (follow the unit's protocol).

#### 1. Lines and tubes

- a. Ensure all lines and tubes above the patient's waist are positioned towards the head of the bed; lines below the waist are positioned toward the foot of the bed e.g., the urinary catheter towards the feet
- b. Ensure enough slack of the lines, monitoring equipment and tubes

#### 2. Adjust bed height for staff safety and easy airway handling. Place the bed in a flat position and remove side rails and headboard

3. Remove the patient's gown, ECG electrodes and leads
4. Temporarily tape the arterial line's transducer to the side of the chest to continue pulse monitoring
5. Place a **sliding sheet** underneath the patient's current sheet and move it in underneath the patient as far as possible
6. Tuck the patient's hand that is on the opposite side of the ventilator under the patient's hip with the palm facing up
7. Cover the patient completely with a clean top sheet, except for the head and neck and roll both top and bottom sheet edges together (burrito method) to encase the patient

## PRONE POSITION/REPOSITION PROTOCOL:

### Skin Protection Strategies



#### PREPARE THE TEAM



#### PREPARE THE PATIENT



#### REPOSITION

8. RT to remove the positioner from underneath the patient's head, hold on to the ETT and support the neck
9. Move the patient up to the head of the bed
10. Move the patient horizontally to the edge of the bed closest to the ventilator
11. **Rotate** the patient 90 degrees on his/her side (side-vertical position) with ETT facing the ventilator
12. Whilst the patient is in side-vertical position, slide the patient horizontally towards the ventilator
13. Team members on the side of the ventilator then pull the rolled-up sheets from beneath the patient, while the other members carefully turn the patient into the supine position
14. Ensure the bottom sheet is **wrinkle-free**
15. Check the ET Tube, lines and tubes and secure the urinary catheter to the upper thigh of the patient
16. Place ECG electrodes on the chest and connect the leads
17. **Elevate the patient's heels** to not touch the support surface for prevention of pressure ulcers
18. Perform **body positioning** for correct alignment and reduction of pressure and shear at high-risk areas
19. Perform a **skin assessment** of the anterior side of the patient
20. Document vital data and skin assessment

---

## AUTHORS:

Anika Fourie (Ghent University, Belgium)  
Dimitri Beeckman (Ghent University, Belgium)

## VERSION 01. 2022

## REVIEWERS:

Maarit Ahtiala, Joyce Black, Heidi Hevia Campos, Fiona Coyer, Amit Gefen, Kim LeBlanc, Steven Smet, Kathleen Vollman, Yolanda Walsh

## DISCLAIMER

Neither the Skin Integrity Research Group nor the authors accept any responsibility for any loss or damage arising from actions or decisions based on the recommendations of this protocol. This protocol reflects generalised information with the focus on the prevention of skin damage of the prone ventilated patient and not the medical aspects of the patient with acute respiratory distress syndrome (ARDS). These recommendations are intended for educational purposes only; to serve as guidance, supplementary to the health care provider's examination and assessment of the individual patient's body habitus and skin, and the patient's specific and unique circumstances. For specialised equipment and devices, follow the manufacturers' recommendations. Ultimate responsibility for patient safety with regards to the treatment of patients and the interpretation of published literature lies with the attending physician.

---

## REFERENCES:

Bamford P, Denmade C, Newmarch C, Shirley P, Singer B, Webb S & Whitmore D. Guidance for Prone Positioning in Adult Critical Care.

Intensive Care Society and Faculty of Intensive Care Medicine. (2019, November). Available at [https://www.wyccn.org/uploads/6/5/1/9/65199375/icsfcm\\_prone\\_guidance\\_final\\_2019.pdf](https://www.wyccn.org/uploads/6/5/1/9/65199375/icsfcm_prone_guidance_final_2019.pdf)

Douglas IS, Rosenthal CA, Swanson DD, Hiller T, Oakes J, Bach J et.al. Safety and Outcomes of Prolonged Usual Care Prone Position Mechanical Ventilation to Treat Acute Coronavirus Disease 2019 Hypoxemic Respiratory Failure\*. Crit. Care Med. 2021;49(3):490-502. doi: 10.1097/CCM.0000000000004818

Guérin C, Reignier J, Richard JC, et al. PROSEVA Study Group. Prone positioning in severe acute respiratory distress syndrome. N Engl J Med. 2013;368:2159-2168. doi:10.1056/NEJMoa1214103

Guérin, C., Albert, R.K., Beitler, J. et al. Prone position in ARDS patients: why, when, how and for whom. Intensive Care Med 46, 2385–2396 (2020). <https://doi.org/10.1007/s00134-020-06306-w>

Intensive Care Society. (2017, June). Ophthalmic Services Guidance : Eye Care in Intensive Care Unit (ICU). [https://www.ics.ac.uk/Society/Guidance/PDFs/Eye\\_Care\\_in\\_ICU](https://www.ics.ac.uk/Society/Guidance/PDFs/Eye_Care_in_ICU)

King-Robson J, Bates E, Sokolov E, Hadden RDM. Prone position plexopathy: an avoidable complication of prone positioning for COVID-19 pneumonitis? BMJ Case Rep. 2022 Jan 4;15(1):e243798. doi: 10.1136/bcr-2021-243798. PMID: 34983806; PMCID: PMC8728371

Malhotra, A. (2022, May 5). Prone ventilation for adult patients with acute respiratory distress syndrome. UpToDate. <https://www.uptodate.com/contents/prone-ventilation-for-adult-patients-with-acute-respiratory-distress-syndrome#H19>

Rush University System for Health. (2020, April 2). Prone Positioning for Acute Respiratory Distress Syndrome (ARDS). <https://www.youtube.com/watch?v=IcBPaHQVvXY>

Scholten EL, Beitler JR, Prisk GK, Malhotra A. Treatment of ARDS With Prone Positioning. Chest. 2017;151:215-224. doi:10.1016/j.chest.2016.06.032

Shearer SC, Parsa KM, Newark A, Peesay T, Walsh AR, Fernandez S, et al. Facial Pressure Injuries from Prone Positioning in the COVID-19 Era. Laryngoscope. 2021;131(7):E2139-e42