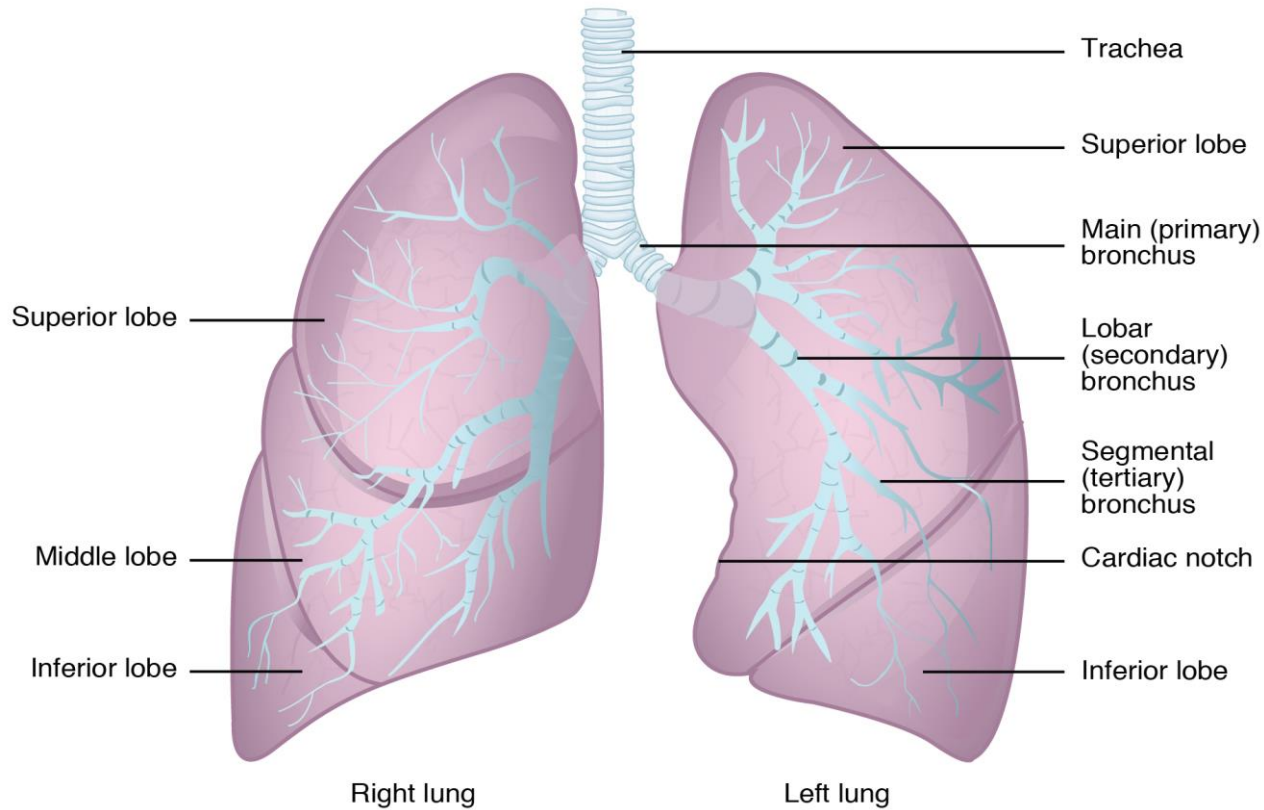




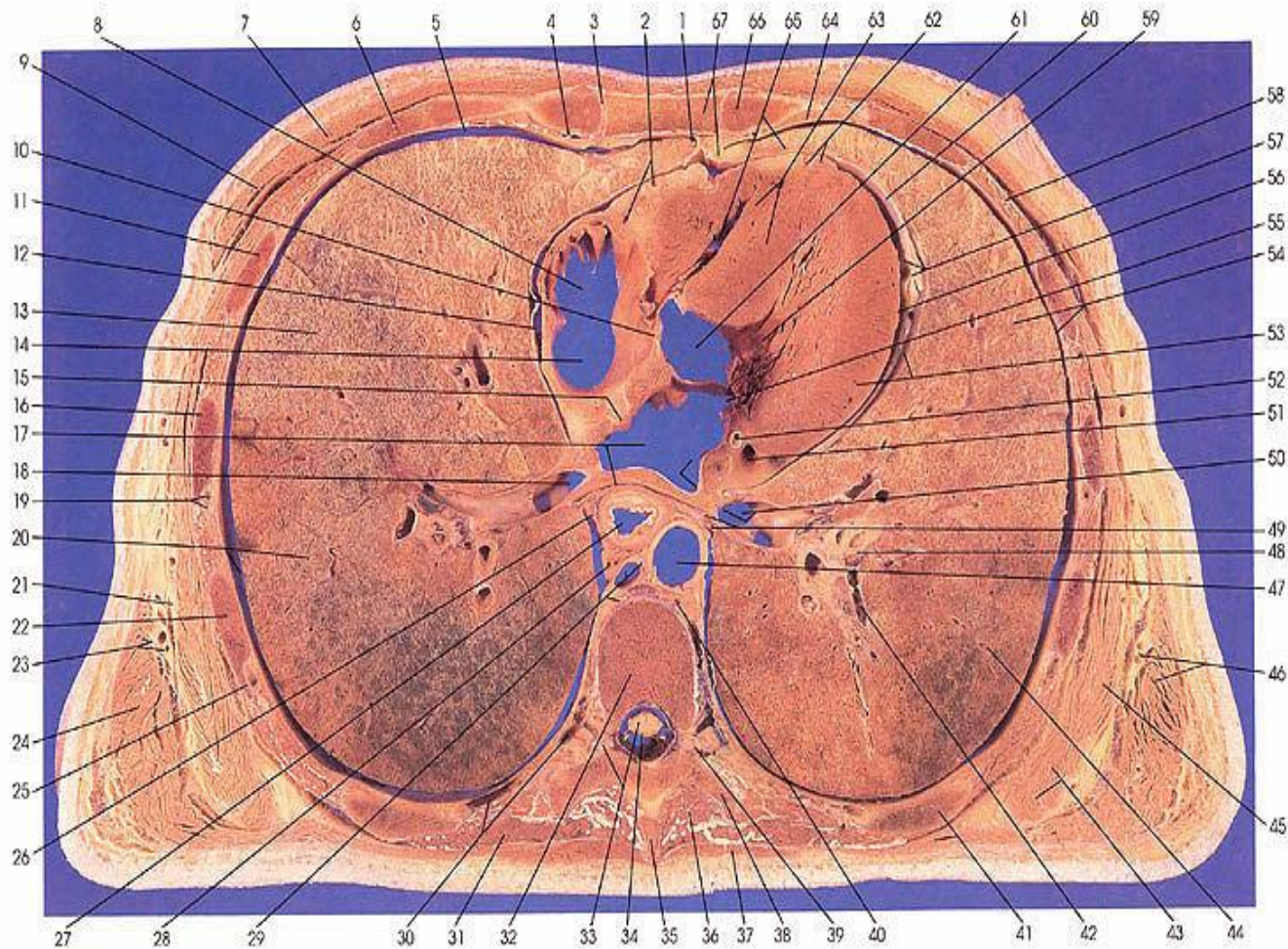
Prone positioning

By Vikki Johnston, Nicola Sutherland & Mervat Bassilious

Normal lung anatomy

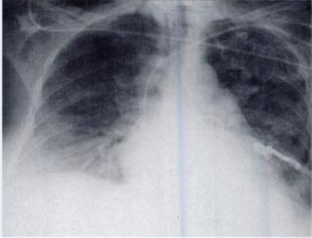
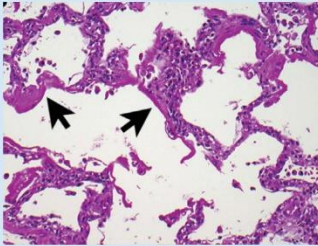


Normal lung anatomy



ARDS

Acute Respiratory Distress Syndrome

Clinical Features	Pathophysiology	Diagnosis	Treatment								
<ul style="list-style-type: none"> Progressive dyspnea Worsening hypoxemia Bilateral infiltrates on chest radiographs Acute onset (<7 days) of inciting event <p>CAUSES</p> <ul style="list-style-type: none"> Direct: Pneumonia, Aspiration Indirect: Sepsis, Trauma 	<ul style="list-style-type: none"> Alveolar injury with diffuse inflammatory response Increased pulmonary vascular permeability with excess interstitial and alveolar fluid Impaired gas exchange, decreased lung compliance, and increased pulmonary arterial pressure  <p>Diffuse alveolar damage (arrows represent hyaline membranes)</p>	<p>A syndrome, not a specific disease. Most recent definition was created by a panel of experts in 2012:</p> <p>BERLIN DEFINITION</p> <ul style="list-style-type: none"> Onset within 1 week of insult or new/worsening respiratory symptoms Respiratory failure unexplained by cardiac function or volume overload Bilateral CXR opacities unexplained by other etiology (eg, effusion, collapse, nodules) Hypoxemia <table border="1"> <thead> <tr> <th></th> <th>PaO₂/Fio₂</th> </tr> </thead> <tbody> <tr> <td>Mild ARDS</td> <td>200-300</td> </tr> <tr> <td>Moderate ARDS</td> <td>100-200</td> </tr> <tr> <td>Severe ARDS</td> <td><100</td> </tr> </tbody> </table>		PaO ₂ /Fio ₂	Mild ARDS	200-300	Moderate ARDS	100-200	Severe ARDS	<100	<p>In addition to treatment of the inciting etiology, consider the following in a stepwise fashion:</p> <ul style="list-style-type: none"> Ventilation strategies: <ul style="list-style-type: none"> Target tidal volume of 4-8 mL/kg ideal body weight Plateau pressures <30 cm H₂O (or transpulmonary pressure < 20 cm H₂O) Conservative oxygen strategy (target PaO₂ 55-80) PEEP: Consider a high PEEP strategy in moderate-severe ARDS Prone positioning Neuromuscular blockade Consider transfer to ECMO center if symptoms do not continue to improve.
	PaO ₂ /Fio ₂										
Mild ARDS	200-300										
Moderate ARDS	100-200										
Severe ARDS	<100										

Images used with permission from the journal CHEST®.
 CHEST. 1990;98(4):1032-1034. DOI: [10.1378/ches.98.4.1032](https://doi.org/10.1378/ches.98.4.1032)
 CHEST. 2018;153(4):825-833. DOI: [10.1016/j.chest.2017.12.007](https://doi.org/10.1016/j.chest.2017.12.007)

Additional references:
 JAMA. 2012;307(23):2526-33. DOI: [10.1001/jama.2012.5669](https://doi.org/10.1001/jama.2012.5669)
 CHEST. 2020;158(6):2381-2393. DOI: [10.1016/j.chest.2020.06.080](https://doi.org/10.1016/j.chest.2020.06.080)

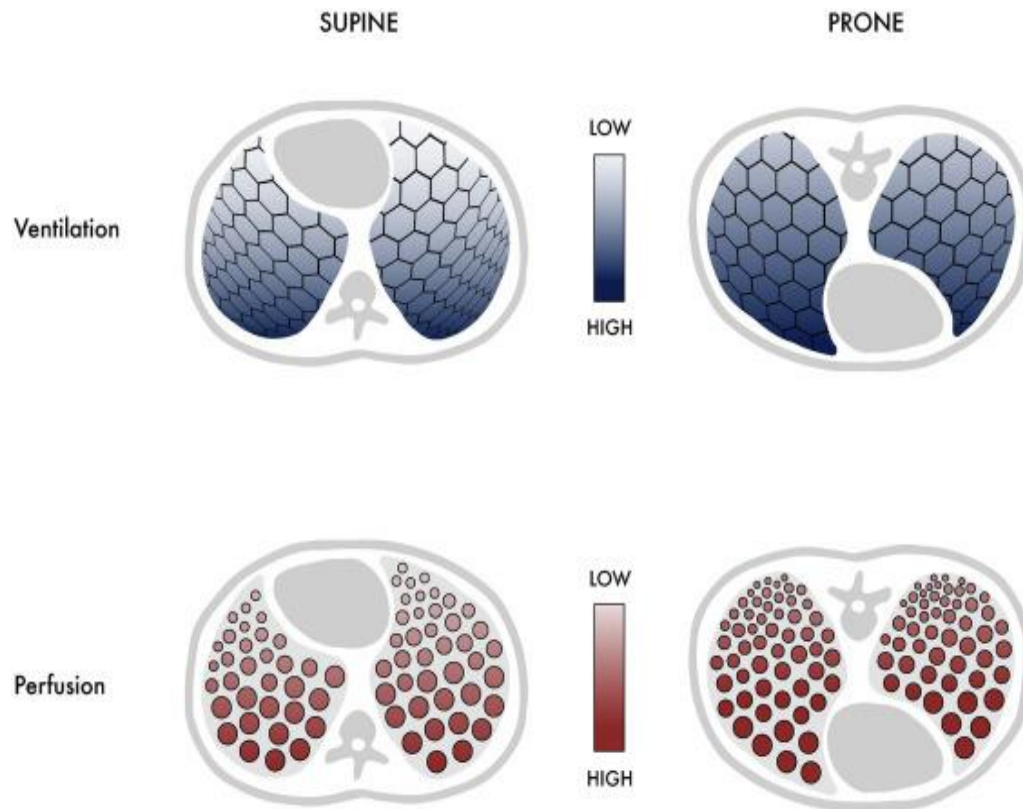
Why prone?

- Severe ARDS
- Posterior wounds/burns/skin flaps

Who to prone?

- Berlin definition – moderate/severe ARDS
- PF ratio ($\text{PaO}_2/\text{FiO}_2$) 0-200mmHg
- APP (Awake Prone Positioning)

Physiological effects of proning



Physiological effects - summary

- Preferentially expands dorsal alveoli
- Reduces V/Q mismatch
- Weight of heart is on sternum, rather than on lung in supine position
- Pleural pressure will be LESS positive hence reduction in atelectasis of alveoli
- Enhances secretion mobilisation
- Less effect of raised intraabdominal pressure on diaphragm when abdomen is UNSUPPORTED therefore increasing FRC

Evidence to support proning

- Previously multiple conflicting RCT but weight of evidence now suggests prone ventilation IS beneficial in selected ARDS patients
- PROSEVA trial (Guerin et al, 2013) show a marked mortality benefit for prone ventilation in ARDS, not just improved oxygenation – includes lung protective ventilation strategies
- PROSEVA recommends:
 - early proning (within 36 hrs) of ARDS onset
 - Ideally, 16 hrs/day prone with average of 4 proned ‘sessions’ but up to 28 days ‘proned’.

Awake Prone Positioning (APP)

- Grew in response to Covid-19 pandemic
- Less evidence
- RCT (Ehrman, 2021) did demonstrate a lower rate of treatment failure in APP patients compared to supine
- Patient compliance is variable

FICM guidelines



Absolute contraindications FICM guidelines

- Unstable spine
- Central VA ECMO cannulation
- Open chest post cardiac surgery
- <24 hrs post cardiac surgery

Considerations

- UNTRAINED STAFF
- Increased ICP
- Increased abdominal pressure
- Abdo/chest wounds
- Extreme obesity
- Haemodynamic instability
- Pregnancy

CPR and proning



Nursing care of the prone patient

Preparation/equipment

who?/proning box

Airway/Breathing

record/secure/suction/per-oxygenate

CVS/lines

secure, discontinue non-essential infusions

Neuro

sedate/?paralysis, RASS-5

Skin/Eyes

record, protect

Tubes/lines

NG/drains/monitor/catheter/CRRT/ECMO

General/Daily hygiene

Wash backs, regular eye & oral care , tracheal & oral suctioning

ICCA family

Position			
Prone			
⊕ Head Of Bed Elevation			
Blood Type			
Blood Gas Reason			
Oxygen % bg			
⊕ H+ bg			
⊕ pH bg			
⊕ pCO2 bg			
⊕ pO2 bg			
⊕ Hct bg			

<Clear Entry>

Soft ties

Tube position/length

Eye care

Eye patches

Oral care

Oral suctioning

Tracheal suctioning

Skin tension

Head manoeuvre

Arm positioning

Lateral tilt

Equipment

- Proning box developed during COVID 19 pandemic
- Contains all equipment for pre-proning preparation

Building Environments to Thrive:
Celebrating Personal and Professional Diversity in Critical Care Nursing

Thank you for your support



Let's demo!