

Evidence to Decision Frameworks: Device-related Pressure Injuries

Clinical question What factors should be considered when selecting medical device?

Recommendation 8.1 **To reduce the risk of medical device related pressure injuries, review and select medical devices with consideration to:**

- **The device’s ability to minimize tissue damage**
- **Correct sizing/shape of the device for the individual**
- **Ability to correctly apply the device according to manufacturer’s instructions**
- **Ability to correctly secure the device.**

Option: Selecting a device specifically for the individual base on a review of the device characteristics and the individual’s needs.

Comparison: Different medical devices, usually a standard stock of device in the facility.

Background: Medical device related pressure injuries (MDRPIs) develop due to prolonged, unrelieved pressure on the skin or mucous membranes from a medical device. Incorrectly positioned or fitted devices, incorrect device use and improperly positioned fixation devices can contribute to MDRPIs,¹ as can the design of the medical device.²

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	<p>No included studies <input type="checkbox"/></p> <p>Very low <input type="checkbox"/></p> <p>Low <input checked="" type="checkbox"/></p> <p>Moderate <input type="checkbox"/></p> <p>High <input type="checkbox"/></p>	<p>Evidence for device designs being associated with MDRPI incidence</p> <ul style="list-style-type: none"> • Oxygen delivery devices with lower tissue/device interface surface area were associated with fewer Category/Stage I MDRPIs in children (facial mask, 75% versus helmet, 0%; p=0.002), without compromising gas exchange.³ (<i>Level 2, moderate quality</i>) • An extended tracheostomy tube design, implemented in conjunction with a multifaceted intervention, was associated with a lower rate of MDRPIs in children than a standard tracheostomy tube design (mean rate over 12 months 0.3% versus 2.6%, p=0.007). The alternate device design was also associated with fewer days with a MDRPI when one occurred (p<0.0001).⁴ (<i>Level 2, moderate quality</i>) • Changing the endotracheal (ET) tube type was associated with a reduction in mucosal membrane pressure injuries (2 MDRPIs in 7592 ventilator days versus 19 MDRPIs in 7175 ventilator days).⁵ (<i>Level 2, low quality</i>) • Type of tracheostomy tube predicted MDRPI complications in children (likelihood ration 4.9, p=0.03).⁶ (<i>Level 4, low quality</i>) • Making an early change from a regular oxygen mask for non-invasive ventilation to a total face mask was associated with significantly fewer MDRPIs than making the change later in the individual’s management (24% versus 87%, p=0.0002).⁷ (<i>Level 4, moderate quality</i>)
	Is there important uncertainty about how much people value the main outcomes?	<p>Important uncertainty or variability <input type="checkbox"/></p> <p>Possibly important uncertainty or variability <input type="checkbox"/></p> <p>Probably no important uncertainty or variability <input checked="" type="checkbox"/></p> <p>No important uncertainty or variability <input type="checkbox"/></p> <p>No known undesirable outcomes <input type="checkbox"/></p>	
	How substantial are the desirable anticipated effects?	<p>Unclear <input checked="" type="checkbox"/></p> <p>Not substantial <input type="checkbox"/></p> <p>Probably not substantial <input type="checkbox"/></p> <p>Probably substantial <input type="checkbox"/></p> <p>Substantial <input type="checkbox"/></p>	

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE
<p>How substantial are the undesirable anticipated effects?</p>	<p>Unclear <input type="checkbox"/> Not substantial <input type="checkbox"/> Probably not substantial <input checked="" type="checkbox"/> Probably substantial <input type="checkbox"/> Substantial <input type="checkbox"/></p>	<p>Evidence for device sizing being associated with MDRPIs</p> <ul style="list-style-type: none"> • Incidence of MDRPIs associated with helmet therapy was higher in children with brachycephaly compared with all children receiving therapy (21.9% versus 10.5%) due to an increased tissue/device interface pressure from devices incorrectly sized to the child's head.⁸ (<i>Level 4, moderate quality</i>) • Incidence of MDRPIs associated with facial oxygen masks was higher in individuals with cranio-facial abnormalities due to masks being positioning over body regions.⁹ (<i>Level 3, low quality</i>) <p>Evidence for securement methods being associated with MDRPI</p> <ul style="list-style-type: none"> • Application of commercial tube securement for nasogastric tubes was associated with a reduced incidence of MDRPI compared to conventional adhesive tape (4% versus 23%, p<0.001).¹⁰ (<i>Level 2, low quality</i>) • Application of a commercial ET tube securement device was associated with an increase in oral pressure injuries compared to a cloth securement (incident rate ratio 2.03, 95% CI 1.17 to 3.51, p=0.02).¹¹ (<i>Level 2, low quality</i>)
<p>Do the desirable effects outweigh the undesirable effects?</p>	<p>No <input type="checkbox"/> Probably No <input type="checkbox"/> Uncertain <input type="checkbox"/> Probably Yes <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Varies <input type="checkbox"/></p>	<p>Strength of Evidence: B2 – Level 2 studies of low quality, Level 3 or 4 studies (regardless of quality) providing direct evidence</p>

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td>Not clear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> <td>Varies</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>No formal cost effectiveness analysis on selecting medical devices was available.</p> <p>One study reported that the per unit cost of an extended-style tracheostomy tube associated with lower MDRPIs was approximately double the cost of a standard tracheostomy tube. Potential cost savings associated with fewer MDRPI were not measured.⁴ (<i>Level 2, moderate quality</i>)</p>
Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies										
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>The appearance of medical devices might influence the acceptability of alternative medical devices by individuals at risk of MDRPI and their caregivers.⁴ (<i>Level 2, moderate quality</i>)</p>
	No	Probably No	Uncertain	Probably Yes	Yes	Varies									
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>										
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No	Probably No	Uncertain	Probably Yes	Yes	Varies										
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>										
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>It may not be possible to select the most appropriately fitted device if the facility does not maintain a wide range of medical devices. (<i>Expert opinion</i>)</p>
No	Probably No	Uncertain	Probably Yes	Yes	Varies										
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>										

Balance of consequences	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input type="checkbox"/>
Strength of recommendation	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input type="checkbox"/>	Strong positive recommendation: Definitely do it <input checked="" type="checkbox"/>
Justification	There is direct evidence that medical device design, shape and sizing are associated with MDRPIs. The evidence from moderate and low quality Level of Evidence 2 to 4 studies reported that adjusting the type of device or securements used is associated with reduction in MDRPI incidence. ^{3-7,11,14} Evidence from moderate and low quality Level 3 and 4 studies indicated that devices that were incorrectly sized or shaped were associated with increased MDRPIs in adults and children. ^{8,9} Recent research indicates that individuals and their informal caregivers consider information on prevention and treatment of MDRPIs to be an important issue.				

Clinical question

What local management strategies are effective in preventing device related pressure injuries (DRPIs)?

Recommendation 8.2

Regularly monitor the tension of medical device securements and where possible seek the individual's self-assessment of comfort.

Option: Reducing tension on securements

Comparison: Differing securement devices or tensions

Background: Medical devices often require some form of securement to the body. The tension of the securement can cause pressure injuries resulting in pain and reduced quality of life for the individual. Ensuring optimal tension of securement devices may reduce the risk of pressure injury.

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE
What is the overall certainty of the evidence of effectiveness?	<p>No included studies <input type="checkbox"/></p> <p>Very low <input checked="" type="checkbox"/></p> <p>Low <input type="checkbox"/></p> <p>Moderate <input type="checkbox"/></p> <p>High <input type="checkbox"/></p>	<p>Evidence for reduction in interface pressure</p> <ul style="list-style-type: none"> In healthy volunteers, increasing oxygen mask strap tension by 5mm and greater was significantly and positively associated with interface pressure ($p < 0.01$).¹⁵ (Level 5, indirect evidence) In healthy volunteers, interface pressure from cervical collars increased significantly when the tension from straps was at the highest level ($p < 0.01$).¹⁶ (Level 5, indirect evidence) <p>Evidence for reduction in temperature and humidity (microclimate)</p> <ul style="list-style-type: none"> In healthy volunteers, reducing the tension of oxygen mask straps had no significant impact on either skin temperature or humidity values ($p > 0.05$).¹⁵ (Level 5, indirect evidence) <p>Evidence for reduction in cytokine concentrations (inflammatory markers)</p> <ul style="list-style-type: none"> In healthy volunteers, an increase in tension of oxygen mask straps was associated with an increase in IL-1α concentrations measured using Sebutabe at the nose bridge (median ratio of 1.34 at highest strap tension, $p < 0.05$).¹⁵ (Level 5, indirect evidence) In healthy volunteers, there was inconsistent trends in changes in IL-1β, IL-8, IL-2, IL-6, IL-10 and IFN-γ associated with changes in tension of oxygen mask straps.¹⁵ (Level 5, indirect evidence) <p>Evidence for reduction in discomfort</p> <ul style="list-style-type: none"> In healthy volunteers, an increase in oxygen mask strap tension by 5mm and greater was associated with greater discomfort ratings on an unreported subjective scale ($p < 0.05$).¹⁵ (Level 5, indirect evidence) In healthy volunteers, an increase in cervical collar strap tension was associated with a significant increase in discomfort ($p < 0.005$).¹⁶ (Level 5, indirect evidence) <p>Adverse events</p> <p>There was no evidence reported on potential adverse events of reducing the tension of medical device securements in healthy volunteers.</p> <p>Strength of Evidence: C – Level 5 studies (indirect evidence).</p>
Is there important uncertainty about how much people value the main outcomes?	<p>Important uncertainty or variability <input type="checkbox"/></p> <p>Possibly important uncertainty or variability <input type="checkbox"/></p> <p>Probably no important uncertainty or variability <input type="checkbox"/></p> <p>No important uncertainty or variability <input checked="" type="checkbox"/></p> <p>No known undesirable outcomes <input type="checkbox"/></p>	
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Do the desirable effects outweigh the undesirable effects?	<p>No <input type="checkbox"/></p> <p>Probably No <input type="checkbox"/></p> <p>Uncertain <input checked="" type="checkbox"/></p> <p>Probably Yes <input type="checkbox"/></p> <p>Yes <input type="checkbox"/></p> <p>Varies <input type="checkbox"/></p>	

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No	Probably No	Uncertain	Probably Yes	Yes	Varies										
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
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No	Probably No	Uncertain	Probably Yes	Yes	Varies										
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>										

Balance of consequences	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input type="checkbox"/>
Strength of recommendation	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
Justification	There is currently no evidence that reducing the tension in medical device securements decreases pressure injuries. However, there is evidence from two studies in healthy volunteers that show that increasing the tension of medical device securements is associated with unfavorable changes in indirect outcome measures, including increased interface pressure, ^{16,17} increases in some markers of inflammatory response ¹⁷ and increased discomfort. ^{16,17} Recent research indicates that patient consumers and their informal caregivers consider information on prevention and treatment of MDRPIs to be an important issue. ^{12,13}				

Clinical question What local management strategies are effective in preventing device related pressure injuries (DRPIs)?

Good practice statement
8.3

Assess the skin under and around medical devices for signs of pressure related injury as part of routine skin assessment.

Background: Conducting frequent skin assessments is considered best practice, although there is no high quality scientific evidence to support this practice. Regular assessment of the skin allows prompt detection of pressure related injury. By identifying risks early, strategies to redistribute pressure can be implemented.

SUPPORTING EVIDENCE (WHEN AVAILABLE)

Evidence to support the opinion (when available)

There is no direct or indirect scientific evidence to support the intervention.

Evidence from consensus recommendations

One consensus document providing expert opinion recommendations on wound dressings to prevent MDRPIs suggests that clinicians should continue to lift/move the medical device and examine the skin.¹

Justification

Conducting frequent skin assessments is considered best practice, although there is no high quality scientific evidence to support this practice in preventing MDRPIs. Regular assessment of the skin allows prompt detection of pressure related injury. By identifying risks early, strategies to redistribute pressure can be implemented.

Clinical question What local management strategies are effective in preventing device related pressure injuries (DRPIs)?

Good practice statement
8.4

Reduce and/or redistribute pressure at the skin-device interface by:

- Regularly rotating or repositioning the medical device and/or the individual
- Providing physical support for medical devices in order to minimize pressure and shear
- Removing medical devices as soon as medically feasible.

Background: Pressure injuries associated with medical devices can occur due to poor positioning of the device, or increased pressure and shear on the tissues caused by the device. Regular pressure redistribution might reduce the risk of MDRPIs.

SUPPORTING EVIDENCE, WHEN AVAILABLE

Evidence to support the opinion (when available)

There is no direct or indirect scientific evidence to support the intervention.

Evidence from consensus recommendations

One consensus document providing expert opinion recommendations on wound dressings to prevent MDRPIs suggests that clinicians should remove hard collars and replace with a soft collar as soon as possible and rotate ET tubes every shift or more often.¹

Justification

Pressure injuries associated with medical devices can occur due to poor positioning of the device, or increased pressure and shear on the tissues caused by the device. Regular pressure redistribution might reduce the risk of MDRPIs.

Clinical question

Is a prophylactic dressing effective for preventing medical device-related pressure injuries (MDRPIs)? If so, what factors should be considered when selecting a prophylactic dressing?

Recommendation 8.5

Use a prophylactic dressing beneath a medical device to reduce the risk of medical device related pressure injuries.

Option: Prophylactic dressing

Comparison: No prophylactic dressing, or different prophylactic dressing types

Background: Prophylactic dressings are designed to provide a soft interface between the skin and a medical device. They conform to the skin and device to redistribute pressure and increase comfort. These dressings are used in a range of patient populations, from neonates to the elderly.

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	<p>What is the overall certainty of the evidence of effectiveness?</p> <p>No included studies <input type="checkbox"/> Very low <input type="checkbox"/> Low <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> High <input type="checkbox"/></p>	<p>Evidence for reducing incidence of MDRPI with hydrocolloid dressing for adults and children</p> <ul style="list-style-type: none"> Significant reduction in MPDRPIs compared to no intervention when a tracheostomy protocol that included applying hydrocolloid dressing for 7 days followed by polyurethane foam dressing after sutures were removed (1.29% versus 10.93%, p=0.0003).¹⁸ (Level 2, high quality) Significant reduction in Stage I pressure injuries associated with oxygen masks compared to no dressing associated with applying hydrocolloid dressing on nasal bridge (40% versus 96.7%, p<0.01).¹⁹ (Level 2, moderate quality)
	<p>Is there important uncertainty about how much people value the main outcomes?</p> <p>Important uncertainty or variability <input type="checkbox"/> Possibly important uncertainty or variability <input type="checkbox"/> Probably no important uncertainty or variability <input checked="" type="checkbox"/> No important uncertainty or variability <input type="checkbox"/> No known undesirable outcomes <input type="checkbox"/></p>	<p>Evidence for reducing incidence of MDRPI with silicone gel sheeting for adults and children</p> <ul style="list-style-type: none"> Children were about 3.5 times less likely to experience nasal pressure injuries associated with ventilation when a thick silicone gel sheeting was applied compared with no dressing (4.3% versus 14.9%, odds ratio [OR] 3.43, 95% confidence interval [CI] 1.1 to 10.1, p<0.05).²⁰ (Level 1, moderate quality) Significant reduction in MPDRPIs when silicone pressure reducing strips were applied under twill ties of endotracheal (ET) tubes compared to no intervention under twill ties (21% versus 5%, p=0.032).²¹ (Level 3, low quality)
	<p>How substantial are the desirable anticipated effects?</p> <p>Unclear <input type="checkbox"/> Not substantial <input type="checkbox"/> Probably not substantial <input type="checkbox"/> Probably substantial <input checked="" type="checkbox"/> Substantial <input type="checkbox"/></p>	<p>Evidence for reducing incidence of MDRPI with polyurethane foam dressing for adults and children</p> <ul style="list-style-type: none"> Significant reduction in Category/Stage I MDRPIs when using polyurethane foam dressing under plaster casts compared with no under cast dressing (3.6% versus 42.9%, p<0.0005).²² (Level 2, moderate quality) Significant reduction in MDRPIs compared to no intervention after implementation of a tracheostomy protocol that included applying polyurethane foam dressing (3.4% versus 0%, p=0.007).⁴ (Level 2, moderate quality)
	<p>How substantial are the undesirable anticipated effects?</p> <p>Unclear <input type="checkbox"/> Not substantial <input checked="" type="checkbox"/> Probably not substantial <input type="checkbox"/> Probably substantial <input type="checkbox"/> Substantial <input type="checkbox"/></p>	<p>Evidence for reducing incidence of MDRPI with transparent film dressing for adults and children</p> <ul style="list-style-type: none"> Significant reduction in Category/Stage I MDRPIs associated with oxygen masks compared to no dressing associated with applying transparent film on nasal bridge (53.3% versus 96.7%, p<0.01).¹⁹ (Level 2, moderate quality) <p>Evidence comparing different prophylactic dressings for reducing incidence of MDRPI in adults and children</p> <ul style="list-style-type: none"> No significant difference was found between a hydrocolloid dressing and a transparent film when used on nasal bridge with an oxygen mask.¹⁹ (Level 2, moderate quality)
	<p>Do the desirable effects outweigh the undesirable effects?</p> <p>No <input type="checkbox"/> Probably No <input type="checkbox"/> Uncertain <input type="checkbox"/> Probably Yes <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Varies <input type="checkbox"/></p>	<p>Adverse events</p> <p>No studies reported adverse events associated with applying a prophylactic dressing for adults or children.</p> <p>Strength of evidence: B1 – Level 1 studies of moderate or low quality providing direct evidence and/or Level 2 studies of high or moderate quality providing direct evidence, most studies have consistent outcomes and inconsistencies can be explained</p>

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence on resources associated with using prophylactic dressings to prevent MDRPIs is available.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
	Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	66.8% (256/383) of respondents to a patient/ informal caregiver survey who identified as having experienced a pressure injury or being at risk of a pressure injury believed that knowing more about medical device related pressure injuries and their prevention is important or very important in caring for themselves. In the same survey, 65.2% (554/850) of informal caregivers believed that knowing more about medical device related pressure injuries and their prevention is important or very important in caring for their family member/friend with or at risk of a pressure injury. ^{12,13} (<i>Indirect evidence</i>)	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Accessibility to prophylactic dressings varies between clinical settings and geographic locations (<i>Expert opinion</i>).	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>											

Balance of consequences	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input type="checkbox"/>
Strength of recommendation	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
Justification	There is direct evidence in a range of populations that application of a prophylactic dressing at the skin-device interface reduces the incidence of MDRPIs. The desirable effects of prophylactic dressings used in conjunction with medical device application is supported by several Level 1, 2 and 3 studies of moderate quality. The evidence included effectiveness in reducing pressure injury incidence when prophylactic dressings were used with tracheostomies, ^{4,18} ET tubes, ²¹ ventilation prongs and masks, ^{19,20} and under casts. ²² A range of different types of prophylactic dressings were evaluated in the literature, including hydrocolloid dressings, ^{18,19} foam dressings, ^{4,18,22,23} silicone gel sheeting ²⁰ and transparent films. ¹⁹ No cost effectiveness studies for prophylactic dressings used in conjunction with a medical device were identified. Recent research indicates that patient consumers and their informal caregivers consider information on prevention and treatment of MDRPIs to be an important issue. ^{12,13}				

Clinical question

What local management strategies are effective in preventing device related pressure injuries (DRPIs)?

Recommendation 8.6

If appropriate and safe, alternate the oxygen delivery device between correctly fitting mask and nasal prongs to reduce the severity of nasal and facial pressure injuries for neonates receiving oxygen therapy.

Option: Alternating between a range of different nasal interfaces to provide neonatal CPAP.

Comparison: Using the same nasal interface to provide neonate CPAP.

Background: Nasal continuous positive airway pressure (CPAP) is the standard for care of preterm infants with respiratory distress syndrome. Nasal CPAP devices have been associated with pressure injuries in neonates. Alternating the type of device used to deliver CPAP could reduce the risk of pressure injuries by changing the tissue/device interface regularly.²⁴

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE										
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	<table border="0"> <tr> <td>No included studies</td> <td>Very low</td> <td>Low</td> <td>Moderate</td> <td>High</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No included studies	Very low	Low	Moderate	High	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Evidence for improvement in nasal and facial “skin excoriation” scores</p> <ul style="list-style-type: none"> In low birthweight neonates, rotating the oxygen therapy delivery option (changing between mask and nasal prongs) is associated with significantly lower scores for “skin excoriation” on the Neonatal Skin Condition Scale (NSCS, scale of 1 to 3) than receiving oxygen therapy by the same device (1.10 [alternating regimen] versus 1.18 [prongs alone] versus 1.19 [mask alone], p=0.007).²⁴ (Level 1, high quality) <p>Evidence for improvement in nasal and facial erythema scores</p> <ul style="list-style-type: none"> In low birthweight neonates, rotating the oxygen therapy delivery option (changing between mask and nasal prongs) was associated with significantly lower erythema scores on the NSCS than using the same oxygen delivery device (1.18 [alternating regimen] versus 1.12 [prongs alone] versus 1.31 [mask alone], p=0.007).²⁴ (Level 1, high quality) <p>Adverse events</p> <ul style="list-style-type: none"> No adverse events were reported from alternating the oxygen therapy device. Although not specifically reported as a concern in the studies reviewed, oxygen saturation levels may vary depending on the type of device in some individuals. <p>Strength of Evidence: B1 – Level 1 studies of moderate or low quality providing direct evidence</p>
	No included studies	Very low	Low	Moderate	High								
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
	Is there important uncertainty about how much people value the main outcomes?	<table border="0"> <tr> <td>Important uncertainty or variability</td> <td>Possibly important uncertainty or variability</td> <td>Probably no important uncertainty or variability</td> <td>No important uncertainty or variability</td> <td>No known undesirable outcomes</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	No known undesirable outcomes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	No known undesirable outcomes								
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
How substantial are the desirable anticipated effects?	<table border="0"> <tr> <td>Unclear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Unclear	Not substantial	Probably not substantial	Probably substantial	Substantial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Unclear	Not substantial	Probably not substantial	Probably substantial	Substantial									
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How substantial are the undesirable anticipated effects?	<table border="0"> <tr> <td>Unclear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Unclear	Not substantial	Probably not substantial	Probably substantial	Substantial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Unclear	Not substantial	Probably not substantial	Probably substantial	Substantial									
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Do the desirable effects outweigh the undesirable effects?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td>Not clear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> <td>Varies</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence of the resource requirements, or a cost effectiveness analysis on alternating devices was available.
Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies										
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.
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Is the option a priority for key stakeholders?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available.	
No	Probably No	Uncertain	Probably Yes	Yes	Varies										
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FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Feasibility may be limited by the range of oxygen delivery devices available within the facility (<i>Expert opinion</i>).
No	Probably No	Uncertain	Probably Yes	Yes	Varies										
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>										

Balance of consequences	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input type="checkbox"/>
Strength of recommendation	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
Justification	There is direct evidence from a high quality Level 1 study ²⁴ that rotation between mask and nasal prongs every four hours reduced nasal and facial pressure injuries (described in the study as excoriation and erythema). The evidence for effectiveness of alternating oxygen delivery methods for reducing MDRPI was conducted in extremely low birth weight neonates in critical care. There are no reported adverse events and a cost analysis was not undertaken.				

Clinical question What local management strategies are effective in preventing device related pressure injuries (DRPIs)?

Good practice statement
8.7

If appropriate and safe, alternate the oxygen delivery between correctly-fitting mask(s) and nasal prongs to reduce the severity of nasal and facial pressure injuries for older children and adults receiving oxygen therapy.

Background: Oxygen delivery devices are associated with more MDRPIs than any other type of medical device.^{25,26} Rotating the anatomical location in contact with a medical device by using different delivery systems might reduce pressure injury risk.

SUPPORTING EVIDENCE, WHEN AVAILABLE

Evidence to support the opinion (when available)

- In a study comparing oxygen delivery to babies (aged 3 to 11 months) a helmet oxygen delivery system was as effective in attaining adequate oxygen saturation levels as a facial or nasal mask, while being associated with lower MDRPI incidence due to the smaller skin-device interface.³ (*Level 2, moderate quality*) This study did not explore rotating between different delivery systems.
- In a study comparing a standard face mask to a total face mask for delivering oxygen to adults in critical care, individuals who changed to the total face mask early in the course of treatment experienced significantly fewer facial pressure injuries (24% versus 87%, $p=0.0002$).²⁷ (*Level 4, moderate quality*) This study did not explore rotating between different delivery systems.

Justification

Although there is no direct evidence on the influence on MDRPI incidence of rotating oxygen delivery systems in older children and adults, evidence can be extrapolated from the studies in neonates, a Level 2 study comparing different oxygen delivery systems conducted in babies,³ and a Level 4 study comparing different oxygen delivery systems in adults.²⁷ Alternating the type of oxygen delivery device can rotate the anatomical areas in contact with a medical device, providing skin and soft tissue with intermittent pressure relief.

Clinical question What are the unique pressure injury prevention strategies for individuals with spinal cord injury

Recommendation 8.8 **In consultation with a qualified health professional, replace an extrication cervical collar with an acute care rigid collar as soon as feasible and remove cervical collars as soon as possible as indicate by clinical condition.**

Option: Extrication cervical collar

Comparison: Acute care rigid cervical collar, soft cervical collar or no cervical collar

Background: Extrication collars are applied to individuals with suspected spinal cord injury (SCI) for reducing spinal range of motion in the acute phase of injury prior to hospitalization.^{28,29}

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS										
BENEFITS & HARMS OF THE PRACTICE	What is the overall certainty of the evidence?	<table border="0"> <tr> <td>No included studies</td> <td>Very low</td> <td>Low</td> <td>Moderate</td> <td>High</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No included studies	Very low	Low	Moderate	High	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Evidence for reduction in pressure injury incidence</p> <ul style="list-style-type: none"> In trauma patients (n=342) the incidence of pressure injuries after removal of a extrication collar was 78.4% (95% CI 73.6-82.6%)²⁸ (Level 4, high quality). In trauma patients (n=254), 28.3% experienced a pressure injury, of which 90.7% were device related (MDRPI). Of these, approximately 55% were related to cervical collars²⁹ (Level 4, high quality). In trauma patients who had extrication collar replaced by an acute care collar within 8 hours of admission (n=484), 6.8% developed a pressure injury.³⁰ (Level 4, moderate quality). <p>Evidence for interface pressure</p> <ul style="list-style-type: none"> In healthy individuals (n=45), four different acute rigid cervical collars had similar profiles with respect to interface pressure at the occiput and anterior mandible. One type of collar was associated with statistically significantly lower interface pressure, but the difference was deemed to have minimal clinical significance.³¹ (Indirect evidence) <p>Strength of Evidence: C - Level 5 studies (indirect evidence) e.g., studies in normal human subjects, humans with other types of chronic wounds, animal models</p>	
	No included studies	Very low	Low	Moderate	High									
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
	Is there important uncertainty about how much people value the main outcomes?	<table border="0"> <tr> <td>Important uncertainty or variability</td> <td>Possibly important uncertainty or variability</td> <td>Probably no important uncertainty or variability</td> <td>No important uncertainty or variability</td> <td>No known undesirable outcomes</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	No known undesirable outcomes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	No known undesirable outcomes									
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
How substantial are the desirable anticipated effects?	<table border="0"> <tr> <td>Unclear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Unclear	Not substantial	Probably not substantial	Probably substantial	Substantial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
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Do the desirable effects outweigh the undesirable effects?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>										
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In one observational study (n=342), 38.5% of individuals reported severe pain (7 to 10 on a 10 point scale) associated with an extrication collar ²⁸ (<i>Level 4, high quality</i>).
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>									
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
Is the option a priority for key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Access to a qualified health professional to assess appropriateness of transfer off a spine board for an individual with suspected spinal cord injury varies (<i>Expert opinion</i>).
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>										

Balance of consequences	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input checked="" type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input type="checkbox"/>
Strength of recommendation	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
Justification	Evidence from high ^{28,29} and moderate ³⁰ quality Level 4 studies indicates that incidence of pressure injuries associated with is extrication collars is high, with one study reporting an incidence rate of over 75%. ²⁸ In an observational study in which an extrication collar was replaced with an acute care collar within eight hours, pressure injury incidence was around 7%. ³⁰ There were no comparative studies demonstrating effect of removing an extrication cervical collar. Indirect evidence demonstrated no clinically significant differences in interface pressure between different models of acute care cervical collars. ³¹				

Clinical question

What local management strategies are effective in preventing device related pressure injuries (DRPIs)?

Skin moisturizing

Option: Application of a skin moisturizer underneath a medical device

Comparison: No intervention or prophylactic dressing.

Background: Facial pressure injuries are common sequelae from use of oro-nasal/facial oxygen delivery devices. Protecting the skin with a skin moisturizer might be effective in reducing MDRPIs without the risk of skin trauma that might occur from applying a prophylactic dressing.³² However, mechanisms by which this intervention is effective are not consistent with current knowledge.

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE										
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence of effectiveness?	<table border="0"> <tr> <td><i>No included studies</i></td> <td><i>Very low</i></td> <td><i>Low</i></td> <td><i>Moderate</i></td> <td><i>High</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No included studies</i>	<i>Very low</i>	<i>Low</i>	<i>Moderate</i>	<i>High</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Reduction in MDRPIs</p> <ul style="list-style-type: none"> Applying a hyperoxygenated fatty acid (HOFA) to the skin beneath a non-invasive oxygen mask was associated with significantly fewer facial pressure injuries compared to no intervention (p=0.055) and compared to applying a polyurethane prophylactic dressing under the mask (p=0.03) and compared to applying a 2-layered prophylactic foam dressing under the mask (p<0.001). Number needed to treat (NNT) to avoid a facial pressure injury by applying HOFA was 2.04.³² (<i>Level 1, low quality</i>) <p>Adverse events</p> <p>There was no evidence reported on potential adverse events of applying skin moisturizer under a medical device.</p> <p>Strength of Evidence: B1 – Level 1 studies of moderate or low quality providing direct evidence</p>
	<i>No included studies</i>	<i>Very low</i>	<i>Low</i>	<i>Moderate</i>	<i>High</i>								
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
	Is there important uncertainty about how much people value the main outcomes?	<table border="0"> <tr> <td><i>Important uncertainty or variability</i></td> <td><i>Possibly important uncertainty or variability</i></td> <td><i>Probably no important uncertainty or variability</i></td> <td><i>No important uncertainty or variability</i></td> <td><i>No known undesirable outcomes</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Important uncertainty or variability</i>	<i>Possibly important uncertainty or variability</i>	<i>Probably no important uncertainty or variability</i>	<i>No important uncertainty or variability</i>	<i>No known undesirable outcomes</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<i>Important uncertainty or variability</i>	<i>Possibly important uncertainty or variability</i>	<i>Probably no important uncertainty or variability</i>	<i>No important uncertainty or variability</i>	<i>No known undesirable outcomes</i>								
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
How substantial are the desirable anticipated effects?	<table border="0"> <tr> <td><i>Unclear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Unclear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
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Do the desirable effects outweigh the undesirable effects?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td><i>Not clear</i></td> <td><i>Not substantial</i></td> <td><i>Probably not substantial</i></td> <td><i>Probably substantial</i></td> <td><i>Substantial</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There was no evidence available on the resource requirements for applying skin moisturizer underneath an oro-nasal/facial medical device.	
<i>Not clear</i>	<i>Not substantial</i>	<i>Probably not substantial</i>	<i>Probably substantial</i>	<i>Substantial</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	
	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>										
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<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>											
FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td><i>No</i></td> <td><i>Probably No</i></td> <td><i>Uncertain</i></td> <td><i>Probably Yes</i></td> <td><i>Yes</i></td> <td><i>Varies</i></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	
<i>No</i>	<i>Probably No</i>	<i>Uncertain</i>	<i>Probably Yes</i>	<i>Yes</i>	<i>Varies</i>											
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Balance of consequences	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input type="checkbox"/>
Strength of recommendation	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
Recommendation (text)	No recommendation				
Justification	There is Level 1 evidence of low quality supporting the use of skin moisturizer to protect the skin underneath facial medical devices. However, the mechanism through which this intervention could be efficacious in preventing pressure injuries is unclear and not consistent with what is currently known regarding physiology and pressure injury etiology. In the Level 1 study, other components of the intervention (e.g. removing the medical device) may have been responsible for the favorable outcomes. Therefore, no recommendation has been made on using skin moisturizers to protect the skin under medical devices.				

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