Evidence to Decision Frameworks: Repositioning and Mobilization for Prevention and Treatment of Pressure Ulcers/Injuries

Clinical question How often should repositioning be performed to reduce the risk of pressure injuries?

Recommendation 5.1 **Reposition all individuals with or at risk of pressure injuries on an individualized schedule, unless contraindicated.**

Option: Repositioning regimen
Comparison: Another repositioning regimen

Background: Extended periods of lying or sitting on a particular part of the body and failure to redistribute the pressure on the body surface can result in sustained deformation of soft tissues, ischemia and tissue damage.[1] Repositioning reduces the pressure experienced by the parts of the body

BENEFITS & HARMS OF THE RECOMMENDED PRACTICE

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
What is the overall certainty of the evidence of effectiveness?	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐	**Evidence for pressure injury incidence** • Individuals in nursing homes (n=838) had significantly fewer Category/Stage II or greater pressure injuries when turned every four hours on a viscoelastic polyurethane foam mattress (3%) compared with turning every six hours on the same mattress (15.9%) and compared with turning every two hours (14.3%) or every three hours (24.1%) on a standard mattress (p=0.002). Odds ratio (OR) of sustaining a Category/Stage II or greater pressure injury for the four hour, high specification mattress group compared to the alternative regimens was 0.12 (95% CI 0.03 to 20.48).[1] (*Level 1, high quality)* • Individuals in nursing homes (n=235) who were turned two hourly lateral positioning plus four hourly supine positioning had no significant difference in incidence of Category/Stage II or greater pressure injuries compared with a group turned every four hours using the same positioning regimen (16.4% versus 21.2%, p=0.40). Relative risk of sustaining a pressure injury was 0.66 (95% CI 0.37 to 1.20).[2] (*Level 1, high quality*) • Individuals in an intensive care unit (n=330) showed no significant difference in Category/Stage II or greater pressure injury incidence between a two-hourly turning regimen (10.3%) and a four-hourly turning regimen (10.3% versus 13.4%, unadjusted hazard ratio [HR] 0.89, 95 % CI 0.46 to 1.71, p=0.73).[3] (*Level 1, high quality*) • Individuals in nursing homes (n=942) showed no significant difference in pressure injury incidence between two, three and four hourly repositioning regimens (2hr: 2.5%; 3hr:0.6%; 4hr: 3.1%, p=0.68). There was also no significant difference in pressure injuries between individuals at moderate and high-risk of pressure injuries (moderate 2.1% versus high 1.8%, p=0.79).[4] (*Level 1, high quality)* • Individuals in nursing homes with activity and mobility limitations (n=213) turned every three hours between 8pm and 8am experienced significantly fewer pressure injuries than individuals turned every six hours (3% versus 11%, (p=0.03, intracluster correlation [ICC] =0.001). Odds ratio for the three hour turning group experiencing a pressure injury was 0.243 (95% CI 0.067 to 0.879, p=0.034).[5] (*Level 1, moderate quality*) • In a cohort of hospitalized individuals (n=269), there was a lower incidence of Category/Stage II or greater pressure injuries among those who were frequently turned, (≥12 manual repositions per hospital day; incidence rate ratio [IRR] 0.39, 95% CI 0.08 to	• Because repositioning is considered to be a necessary intervention, no studies compare repositioning to no repositioning. • In some of these studies pressure injury incidence may have been influenced by different support surfaces,[1,2] and the individual's pressure injury risk level, in addition to the positioning interventions being compared.
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☐ | *No important uncertainty or variability* ☒ | *No known undesirable outcomes* ☐		
How substantial are the desirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☒		
How substantial are the undesirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☒ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐		
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐		

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
			1.84). When considering all individuals regardless of risk, there was no difference in incidence of Category/Stage II or greater pressure injuries per person-day between individuals receiving ≥12 manual repositions per hospital day or those receiving fewer repositioning (IRR 1.12, 95% CI 0.52 to 2.42).[6] (*Level 3, moderate quality*) **Potential adverse effects** • Individuals have reported that pain can be associated with repositioning.[7] *(Qualitative evidence, high quality*) • Individuals in hospital (n=1,395), 70% who had had surgery, reported a mean pain score of 4.9±3.1 (scale 1 to 10) when being repositioned.[8] (*Indirect evidence*) • Hemodynamic or respiratory instability can arise when repositioning a critically-ill individual. (*Expert opinion*) • Repositioning overnight can adversely affect sleep. When possible, develop repositioning regimens that minimize disruption to the individual's sleep. (*Expert opinion*) **Strength of Evidence: B1 - More than one high quality Level I study providing direct evidence; most studies have consistent outcomes and inconsistencies can be explained**	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☐ *Not sub-stantial* ☒ *Probably not sub-stantial* ☐ *Probably sub-stantial* ☐ *Sub-stantial* ☐ *Varies* ☐	• One study estimated the lifetime incremental cost effectiveness of repositioning individuals in aged care every three hours was $102,276 and 0.636 (0.118 to 1.172) quality adjusted life years (QALYs). Costs were higher for two hourly or four hourly repositioning schedules (Canadian dollars in 2014).[9] (*High quality economic analysis*) • An economic analysis determined financial savings of switching from a two-hourly repositioning schedule to three- or four-hourly schedule would be $4,032 and $6,109 respectively annually/per resident at pressure injury risk. Costs were modelled on a 123 bed nursing facility in which 33% of residents are at moderate to high pressure injury risk, calculated using 2012 Canadian dollars).[10] (*High quality economic analysis*)	
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☒ *Yes* ☐ *Varies* ☐	• For individuals in an intensive care unit (n=330), the mean implementation rate for a two-hourly turning schedule was 60.46±23.55% and the mean implementation rate for a four-hourly turning schedule 61.03±22.36%.[3] (*Level 1, high quality*) • For individuals in nursing homes (n=942), adherence to a repositioning schedule was 82%.[4] (*Level 1, high quality*) • In a cohort of hospitalized individuals (n=269), were 53% (187/354) were repositioned at least 12 times per day on index visit days.[6] (*Level 3, moderate quality*)	
	Is the option a priority for key stakeholders?	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☐ *Yes* ☒ *Varies* ☐	76.2% (292/383) 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 positioning is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning is important or very important in caring for their family member/friend with or at risk of a pressure injury.[11,12] (*Indirect evidence*)	
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☐ *Yes* ☒ *Varies* ☐	In most clinical and geographic settings repositioning in feasible to implement. While some individuals may not be able to be fully turned due to a critical clinical condition, small weight shifts are usually possible. (*Expert opinion*)	

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings	Undesirable consequences *probably outweigh* desirable consequences in most settings	The balance between desirable and undesirable consequences *is closely balanced or uncertain*	Desirable consequences *probably outweigh* undesirable consequences in most settings	Desirable consequences *clearly outweigh* undesirable consequences in most settings
	☐	☐	☐	☐	☒
Strength of recommendation	Strong negative recommendation: Definitely don't it	Weak negative recommendation: Probably don't do it	No specific recommendation	Weak positive recommendation: Probably do it	Strong positive recommendation: Definitely do it
	☐	☐	☐	☐	☒

Justification

Evidence from one high quality Level 1 study[1] and one moderate quality Level 1 study[5] demonstrated that repositioning individuals more regularly is associated with a lower incidence of pressure injuries. However, the evidence is conflicting regarding potential differences between different turning frequencies. Evidence from two high[2,4] and one moderate[3] quality Level 1 studies showed no significant reduction in pressure injury incidence associated with more frequent repositioning. However, in one of these high quality Level 1 studies,[4] all repositioning regimens were associated with pressure injury incidence below 3.1%. A moderate quality Level 3 study[6] reported statistically significant difference between different repositioning frequencies, reporting an incidence rate ratio of 1.12 (95% CI 0.52 to 2.42) for frequent repositioning compared with infrequent repositioning.

The Level 1 studies[1-5] demonstrated that different repositioning frequencies (e.g. two, three or four hourly) are all at least somewhat effective. Reported variations in pressure injury incidence for different repositioning frequencies could be explained by the range of pressure injury risk for individuals in the studies, and the support surfaces used. Mattresses used in early studies may also be less effective than contemporary support surfaces. Adverse events associated with repositioning were a possibility of the individual experiencing increased pain during repositioning.[7,8] High quality level 1 evidence and moderate quality level 3 evidence reported adherence to repositioning regimens ranging between 53% and 82%.[3,4,6] Two high quality economic analyses demonstrated that costs of implementing frequent repositioning in aged care facilities were not substantial and were related to improvement in quality-adjusted life years.[9,10] Indirect evidence suggested that patients and informal caregivers place high importance on understanding more about the role of repositioning in preventing pressure injuries.[11]

Clinical question What criteria should be used to determine and monitor frequency of turning?

Recommendation 5.2 **Determine repositioning frequency with consideration to the individual's level of activity, mobility and ability to independently reposition.**

Option: Considering whether an individual can reposition sufficiently
Comparison: N/A

Background: Extended periods of lying or sitting on a particular part of the body and failure to redistribute the pressure on the body surface can result in sustained deformation of soft tissues, ischemia and tissue damage.[1] Repositioning reduces the pressure experienced by the parts of the body.

BENEFITS & HARMS OF THE RECOMMENDED PRACTICE

CRITERIA	JUDGEMENTS
What is the overall certainty of the evidence of effectiveness?	*No included studies* ☐ | *Very low* ☒ | *Low* ☐ | *Moderate* ☐ | *High* ☐
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☒ | *Probably no important uncertainty or variability* ☐ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐
How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐
How substantial are the undesirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☐ | *Probably not substantial* ☒ | *Probably substantial* ☐ | *Substanital* ☐
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐

RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS

Evidence for mobility influencing pressure injury incidence

- In hospitalized adults who were independently mobile in bed (n=101), no individuals experienced a pressure injury during observation periods up to 32 hours.[13] (*Level 4, moderate quality*)

Evidence for frequency of self-positioning

- In hospitalized adults who were independently mobile in bed (n=101), only two participants had periods longer than four hours without repositioning during observation periods up to 32 hours.[13] (*Level 4, moderate quality*)
- In hospitalized individuals with neurologic or orthopedic conditions (n=26), individuals self-repositioned a median of 3.0 times (IQR, 2.50; range 1–9) during the day, 4.0 times (IQR, 3.0; range 0–7) during the afternoon and 4.0 times (IQR, 3.0; range 1–8) overnight.[14] (*Indirect evidence*)
- In older adults in hospital or long term care (n=52), individuals spontaneously repositioned a median of 16 times (Q1 5 to Q3 52) during the day and a median of 10 times overnight (Q1 4 to Q3 33).[15] (*Indirect evidence*)
- In hospitalized adults (n = 84), 94.5% were classified as sedentary during their hospitalization based on physical activity monitor results; however, the median number of self-initiated posture repositioning (rotation of >10° for at least 5 minutes) in a 24-hour period was 94 (SD 48).[16] (*Indirect evidence*)
- In individuals with spinal cord injury (SCI), average times transferred out of the wheelchair over 24 hours was 8.4 (SD 4.3), pressure relief was performed an average 0.4 (SD 0.5) times per hour during chair sitting and weight shifts were performed an average of 2.4 (SD 2.2) times per hour.[17] (*Indirect evidence*)

Potential adverse effects
None relevant

Strength of Evidence: B2 - Level 3 or 4 studies (regardless of quality) providing direct evidence

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	There is no evidence on the resource requirements for assessing ability to reposition independently.
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	No evidence available
	Is the option a priority for key stakeholders?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	76.24% (292/383) 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 how and when to reposition themselves was an important or very important information topic. In the same survey, 69.76% (593/850) of informal caregivers believed that knowing more about what how and when to reposition is an important or very important in caring for their family member/friend with or at risk of a pressure injury.[11,12] (*Indirect evidence*)
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	In most clinical settings it is feasible to assess an individual's ability to self-reposition before developing a pressure injury prevention plan. (*Expert opinion*)

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☐	Desirable consequences *probably outweigh* undesirable consequences in most settings ☒	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☐	Weak positive recommendation: Probably do it ☐	Strong positive recommendation: Definitely do it ☒
Justification	A moderate quality Level 4 study[13] provided evidence that when individuals can reposition independently, they experienced no pressure injuries. The study showed that individuals repositioned themselves within a four-hour duration.[13] Indirect evidence from observational studies[14,16-18] showed that many hospitalized adults are independently mobile and active. Observed individuals reposition themselves regularly in bed (or in the chair if they are wheelchair bound). One study classified hospitalized adults as sedentary although they continued to perform self-initiated activity frequently. Understanding the individual's activity and ability to reposition themselves helps determine the level of assistance they will require in repositioning.				

Clinical question	What criteria should be used to determine and monitor frequency of turning?
GOOD PRACTICE STATEMENT	***Background:*** Extended periods of lying or sitting on a particular part of the body and failure to redistribute the pressure on the body surface can result in sustained deformation of soft tissues, ischemia and tissue damage.[1] Repositioning reduces the pressure experienced by the parts of the body.
	SUPPORTING EVIDENCE, WHEN AVAILABLE
Evidence to support the opinion (when available)	A number of Level 1 and Level 2 prognostic studies[19-23] indicate that skin changes are associated with increased risk of pressure injuries. Odds ratio of developing a Category/Stage II or greater pressure injury when non-blanchable erythema was identified ranged from 3.25 (95% CI 2.17 to 4.86)[19] to 7.98 (95% CI 2.36 to 39.97).[21] Evidence from studies in general hospital populations (i.e. without pressure injuries) showed that pain is experienced during repositioning. The mean pain score on an 11-point numerical rating scale during repositioning was 4.9±3.1.[8] (*Indirect evidence*) The experience of pain during repositioning was also reported in a qualitative study conducted in people with multiple sclerosis and pressure injuries. Participants reported pain during movement and related to repositioning equipment.[7] (*Indirect evidence*)
Good Practice Statement 5.3	**Determine repositioning frequency with consideration to the individual's:** • **Skin and tissue tolerance** • **General medical condition** • **Overall treatment objectives** • **Comfort and pain**
Justification	A number of Level 1 and Level 2 prognostic studies[19-23] indicate that skin changes are associated with increased risk of pressure injuries. Odds ratio of developing a Category/Stage II or greater pressure injury when non-blanchable erythema was identified ranged from 3.25 (95% CI 2.17 to 4.86)[19] to 7.98 (95% CI 2.36 to 39.97).[21] Identifying skin changes early by conducting a skin assessment enables health professionals to adjust repositioning (and other interventions) to prevent pressure injuries. General medical condition can influence how often it is possible to reposition the individual. Individuals who are critically ill may experience dyspnea or hemodynamic instability unless a specific position is maintained. When determining repositioning frequency consideration should be given to the individual's experience of pain, including both comfort and pain lying in one position and any pain experienced during repositioning,[7,8] as well as the individual's treatment goals.

Clinical question How often should repositioning be performed to reduce the risk of pressure injuries?

Recommendation 5.4 **Implement repositioning reminder strategies to promote adherence to repositioning regimens.**

Option: Implementing a program to promote adherence
Comparison: No compliance program

Background: Extended periods of lying or sitting on a particular part of the body and failure to redistribute the pressure on the body surface can result in sustained deformation of soft tissues, ischemia and tissue damage.[1] Repositioning reduces the pressure experienced by the parts of the body; however, adherence to repositioning schedules is variable.[24] Facility-based systems reminder systems may promote adherence.[24-26]

BENEFITS & HARMS OF THE PRACTICE

CRITERIA	JUDGEMENTS
What is the overall certainty of the evidence?	*No included studies* ☐ · *Very low* ☐ · *Low* ☐ · *Moderate* ☒ · *High* ☐
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ · *Possibly important uncertainty or variability* ☐ · *Probably no important uncertainty or variability* ☐ · *No important uncertainty or variability* ☒ · *No known undesirable outcomes* ☐
How substantial are the desirable anticipated effects?	*Unclear* ☐ · *Not substantial* ☐ · *Probably not substantial* ☐ · *Probably substantial* ☒ · *Substantial* ☐
How substantial are the undesirable anticipated effects?	*Unclear* ☐ · *Not substantial* ☒ · *Probably not substantial* ☐ · *Probably substantial* ☐ · *Substantial* ☐
Do the desirable effects outweigh the undesirable effects?	*No* ☐ · *Probably No* ☐ · *Uncertain* ☐ · *Probably Yes* ☐ · *Yes* ☒ · *Varies* ☐

RESEARCH EVIDENCE

Evidence for pressure injury incidence

- In individuals in intensive care (n=1,312), there was significant reduction in pressure injury rate associated with a wearable patient sensor that relayed information to health professionals about time for next repositioning compared with standard care (0.7% versus 2.3%, OR 0.33, 95% CI 0.12 to 0.90, p=0.031). [25] (*Level 1, high quality*)
- In individuals in aged care (n=1,928) were 45% less likely to develop a new pressure injury in a facility that used a public musical tone to signal turning rounds compared to facilities without using the musical chime signal.[26] (*Level 1, moderate quality*)

Evidence for improving compliance with care regimens

- In individuals in intensive care (n=1,312), a wearable patient sensor that relayed information to health professionals about time for next repositioning was associated with significantly higher compliance with turning patients compared with standard care (67% compliance versus 54%, difference 0.11, 95% CI 0.08 to 1.13, p<0.001).[25] (*Level 1, high quality*)

Adverse events
None reported

Strength of Evidence: B1 - Level 1 studies of moderate or low quality providing direct evidence

ADDITIONAL CONSIDERATIONS

One study (n=555) reported that compliance with a repositioning regimen by health professionals was significantly related to:

- patient BMI (decreasing as BMI increased, p<0.005)
- Patient age (increasing with increased age, p=0.01)
- high risk Braden score compared to low score risk (55% versus 66%, p<0.005)
- Female gender (57% versus 49%, p<0.005).[24] (*Indirect evidence)*

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☐ *Not sub-stantial* ☐ *Probably not sub-stantial* ☐ *Probably sub-stantial* ☐ *Sub-stantial* ☐ *Varies* ☒	There is no evidence on resources required to implement facility-wide reminder systems, but resources are likely to vary widely depending on the type of system used and the facility's geographic location (*Expert opinion*).	
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☒ *Yes* ☐ *Varies* ☐	• In individuals in intensive care (n=1,312), a wearable patient sensor that relayed information to health professionals about time for next repositioning was associated with significantly higher compliance with turning patients compared with standard care (67% compliance versus 47%, p<0.001).[11,12] (*Level 1, high quality*)	
	Is the option a priority for key stakeholders?	*No* ☐ *Probably No* ☐ *Uncertain* ☒ *Probably Yes* ☐ *Yes* ☐ *Varies* ☐	No evidence is available.	
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☐ *Yes* ☐ *Varies* ☒	Some facility-based reminder systems (e.g. musical chimes) are more feasible than others (wearable patient sensors) because resources and access to equipment may be limited in some clinical or geographic settings. The principles could be adapted in community-based care (e.g. using a phone alarm). (*Expert opinion*)	

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☐	Desirable consequences *probably outweigh* undesirable consequences in most settings ☒	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☐	Weak positive recommendation: Probably do it ☒	Strong positive recommendation: Definitely do it ☐
Justification	Two Level 1 studies, one of high quality[25] and one of moderate quality[26] demonstrated that a facility-based intervention could improve health professional compliance with repositioning, leading to a reduction in pressure injury incidence. Auditory or visual feedback systems (in the evidence – wearable patient sensors[25] and musical chimes[26]) can cue health professionals to round or undertake required repositioning. Health professional compliance with repositioning was significantly increased by 20% when the intervention was implemented in one of the studies.[25] Compliance with repositioning regimens was sub-optimal, reported at 67% in a study that implemented a facility-wide reminder system,[25] with indirect evidence suggesting the individual's gender, body mass index (BMI), age and Braden Scale score influence compliance rates.[24] Resource requirements and feasibility are likely to vary widely based on the type of intervention selected and the facility's location.				

Clinical question	How often should repositioning be performed to reduce the risk of pressure injuries?
Good Practice Statement 5.5	**Reposition the individual in such a way that optimal offloading of all bony prominences and maximum redistribution of pressure is achieved.**

Background: When choosing a particular position for the individual, it is important to assess whether the pressure is actually relieved or redistributed. For example, it is possible to inadvertently place the individual in a position such that smaller areas of the body, such as the heels, are continuously exposed to pressure.

	SUPPORTING EVIDENCE, WHEN AVAILABLE
Evidence to support the opinion (when available)	None
Justification	Individual anatomy may vary; therefore, some positions may offload pressure points in one individual but be inadequate in offloading pressure for another individual.

Clinical question	What positioning techniques are most effective in redistributing pressure and preventing shear?

Recommendation 5.6 — Reposition the individual to relieve or redistribute pressure using manual handling techniques and equipment that reduce friction and shear.

Option: Using manual handling equipment
Comparison: Positioning the individual without manual handling equipment

Background: Repositioning the individual redistributes and relieves pressure. However, the procedure of repositioning might expose individuals to factors that increase pressure injuries, including shear, if the individual is not correctly repositioned. Manual handling equipment designed to lift the individual off the support surface during repositioning might reduce pressure injury incidence.[27]

BENEFITS & HARMS OF THE RECOMMENDED PRACTICE

CRITERIA	JUDGEMENTS
What is the overall certainty of the evidence of effectiveness?	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☒ | *Probably no important uncertainty or variability* ☐ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐
How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐
How substantial are the undesirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substanital* ☐
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐

RESEARCH EVIDENCE

Evidence for pressure injury incidence

- In a trauma ICU (n=59), using a low friction linen sheet for repositioning together with low microclimate pillows was associated with fewer pressure injuries than standard repositioning together with regular pillow (20% versus 3.4%, p=0.04).[28] (*Level 2, low quality*)
- In long term care facilities (n=271), significantly more individuals at high risk of pressure injuries experienced a pressure injury in facilities that had four or fewer powered mechanical lifts of any sort compared with facilities with eight or more powered mechanical lifts of any sort (14.94% versus 9.74%, p<0.001).[27] (*Level 4, moderate quality*)
- In long term care facilities (n=271), significantly more individuals at high risk of pressure injuries experienced a pressure injury in facilities with one or fewer sit-stand powered mechanical lifts compared with facilities with here or more sit-stand powered mechanical lifts (16.10% versus 9.62%, p<0.001).[27] (*Level 4, moderate quality*)

Evidence for reducing pressure injury risk factors

- In long term care facilities (n=271), significantly more residents were assessed as being bed-bound in facilities with four or fewer powered mechanical lifts of any sort compared with facilities with eight or more powered mechanical lifts of any sort (3.44% versus 1.72%, p=0.013).[27] (*Level 4, moderate quality*)

Potential adverse effects

There was an increase in the rate of falls associated with a facility having more sit-stand powered mechanical lifts (13.06 falls per 100 residents in facilities with 0-1 sit-stand lifts increasing to 15.30 falls per 100 residents in facilities with 3 or more lifts, p=0.019). This also translated to an increase in fractures associated with a facility having more powered sit-stand lifts (p=0.005). [27] (*Level 4, moderate quality*)

Strength of Evidence: B2 - Level 3 or 4 studies (regardless of quality) providing direct evidence

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	There is no evidence available on the resource requirements.	
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	No evidence available.	
	Is the option a priority for key stakeholders?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	76.2% (292/383) 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 positioning in a bed or chair is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning in a bed or chair is important or very important in caring for their family member/friend with or at risk of a pressure injury. Preventing a pressure injury was a care goal for 68.9% of patients and 65.2% of informal caregivers.[11,12] (*Indirect evidence*)	
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☒	Manual handling equipment (especially powered varieties) may not be available in all clinical or geographic locations. (*Expert opinion*)	

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☐	Desirable consequences *probably outweigh* undesirable consequences in most settings ☒	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☐	Weak positive recommendation: Probably do it ☒	Strong positive recommendation: Definitely do it ☐
Justification	One low quality Level 2[28] study reported lower rates of pressure injuries associated with low friction turn sheets compared to a standard turning technique. One moderate quality Level 4 study[27] provided evidence that pressure injury incidence is around 5 to 7% lower in facilities that provide more powered manual handling equipment. Individuals in facilities with fewer mechanical lifting devices were more likely to be assessed as bedbound, increasing their pressure injury risk. However, having more powered mechanical lifts was associated with a small but statistically significant increase in fall incidents, which translated to an increased rate of fractures.[27] There was no evidence available on resource requirements or acceptability to individuals or their caregivers.				

Clinical question What positioning techniques are most effective in redistributing pressure and preventing shear?

Recommendation 5.7 **Consider using continuous bedside pressure mapping as a visual cue to guide repositioning.**

Option: Continuous bedside pressure mapping
Comparison: No continuous bedside pressure mapping

Background: Continuous pressure mapping systems provides real-time feedback on the interface pressure at an individual's pressure points, allowing health professionals to identify when an individual requires repositioning.[29]

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	**What is the overall certainty of the evidence of effectiveness?**	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐	**Evidence for pressure injury incidence** • In individuals in a medical ward (n=190), using continuous bedside pressure mapping with real time output showed had impact on pressure injury incidence than not using pressure mapping (mapping 10.1% vs no mapping 8.6%, incidence rate ratio 1.13, 95% confidence interval [CI] 0.34 to 3.79).[30] (*Level 1, high quality*) • In a medical intensive care unit (ICU, n=422), use of continuous bedside pressure mapping with real time output showed was associated with improved pressure detection and pressure relieving interventions leading to a significant reduction in the incidence of pressure injuries compared with not using pressure mapping (0.9% versus 4.8%, p=0.02).[31] (*Level 2, high quality*) • In a medical ICU (n=627), use of continuous bedside pressure mapping with real time output showed was associated with a significant reduction in the incidence of pressure injuries compared with not using pressure mapping (0.3% versus 5%, p=0.001).[32] (*Level 3, low quality*) **Potential adverse effects** None reported. **Strength of Evidence: C - A body of evidence with inconsistencies that cannot be explained, reflecting genuine uncertainty surrounding the topic**	
	Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☐ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☒		
	How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐		
	How substantial are the undesirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☐ | *Probably not substantial* ☒ | *Probably substantial* ☐ | *Substanital* ☐		
	Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐		

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	There was no evidence on the resource requirements to implement continuous bedside pressure mapping.
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	• Evidence from a qualitative study indicated that nurses (n=21) felt continuous bedside pressure mapping was a useful tool to prevent pressure injuries in individuals at high risk but identified a need for education, training and coaching to best implement the intervention.[29] (*Level 5,high quality*) • Individuals in a medical ward (n=190) subjectively rated the comfort of a bed with continuous bedside pressure mapping as 8 (scale 0 to 10) after three days of use, which was the same as individuals using a bed without pressure mapping.[30] (*Level 5, high quality*) • In a medical ICU (n=627), 88% of health professionals (n=32) rated continuous bedside pressure mapping as assisting in repositioning protocols and 84% rated the technology as assistive to providing repositioning.[32] (*Level 5 evidence* • In an acute long-term care facility (n=10), 100% of health professionals rated continuous bedside pressure mapping as easy to use (*Level 5 evidence*).[33] • In an observational study, nurses (n = 16) rated continuous bedside pressure mapping as a valuable complement to repositioning techniques and as easy to interpret[34] (*Level 5 evidence*).
	Is the option a priority for key stakeholders?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐	76.24% (292/383) 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 how and when to reposition themselves was an important or very important information topic. In the same survey, 69.76% (593/850) of informal caregivers believed that knowing more about what how and when to reposition is an important or very important in caring for their family member/friend with or at risk of a pressure injury.[11,12] The survey did not specifically ask about pressure mapping. (*Indirect evidence*)
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☒	• Nurses (n=21) identified a need for concurrent education and training and restructuring the way they worked in order to implement continuous bedside pressure mapping.[29] (*Level 5,high quality*) • Continuous bedside pressure mapping may not be available in all geographic and clinical settings. (*Expert opinion*)

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings	Undesirable consequences *probably outweigh* desirable consequences in most settings	The balance between desirable and undesirable consequences *is closely balanced or uncertain*	Desirable consequences *probably outweigh* undesirable consequences in most settings	Desirable consequences *clearly outweigh* undesirable consequences in most settings
	☐	☐	☐	☒	☐
Strength of recommendation	Strong negative recommendation: Definitely don't it	Weak negative recommendation: Probably don't do it	No specific recommendation	Weak positive recommendation: Probably do it	Strong positive recommendation: Definitely do it
	☐	☐	☒	☐	☐
Justification	The evidence on effectiveness of continuous bedside pressure mapping in preventing pressure injuries was mixed. A high quality Level 1 study[30] found no significance on the incidence or severity of pressure injuries when pressure mapping was implemented in a medical ward. However, a high quality Level 2 study[31] and a low quality Level 3 study[32] both reported significant reductions in pressure injury incidence in medical ICUs when pressure mapping was used. Patient consumers provided evidence that pressure mapping was not uncomfortable[30] on the bed and health professionals identified the intervention as both helpful in performing repositioning and easy to use,[32-34] but highlighted that education and training is required to implement pressure mapping.[29] No evidence on resource requirements was identified..				

Clinical question What positioning techniques are most effective in redistributing pressure and preventing shear?

Recommendation 5.8 **Use the 30° lateral side lying position in preference to the 90° side lying position when positioning.**

Option: Positioning in 30° side lying position
Comparison: Positioning in 90° side lying position or positioning in supine position

Background: Prolonged lying predisposes an individual to pressure injuries. Positioning to reduce interface pressure, in addition to regular repositioning are a priority in the prevention of pressure injuries.

BENEFITS & HARMS OF THE RECOMMENDED PRACTICE

CRITERIA	JUDGEMENTS
What is the overall certainty of the evidence of effectiveness?	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☒ | *Probably no important uncertainty or variability* ☐ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐
How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐
How substantial are the undesirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substanital* ☐
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐

RESEARCH EVIDENCE

Evidence for pressure injury incidence
Favors 30° side lying position

- In older adults (n=213), a group repositioned every three hours (at night) using the 30° side lying position (alternately right side, back, left side) had significantly fewer pressure injuries than a group repositioned every six hours (at night) with 90° lateral rotation (3% versus 11%, (p=0.03, intracluster correlation [ICC] =0.001).The odds risk (OR) of experiencing a pressure injury in the 30° side lying group was 0.2343 (95% CI 0.067 to 0.879, p=0.034).[35] (*Level 1, moderate quality*)

Does not favor 30° side lying position

- In individuals in acute care (n=46), a group repositioned every three hours (at night) using the 30° side lying position did not have a significant difference in rate of Category/Stage I pressure injuries at 24 hour follow-up compared to a group repositioned every three hours (at night) using the 90° side lying position (13% vs 9%, p>0.05).[36] (*Level 1, low quality*)

Effectiveness for pressure injury related clinical outcome measures

- In older hospitalized adults (n=20), median relative change in skin blood flow over the bony prominences decreased significantly in the 30° side lying position (p<0.05 compared with supine positions) after 5 minutes of loading.[37] (*Level 4, moderate quality)*
- In older adults (n= 25), temperatures were significantly lower over trochanter in lateral 90° and lateral 30° side lying positions (both p<0.001) after 60 minutes of loading.[18] (*Level 4, low quality)*

Effectiveness for reducing interface pressure

- In older adults (n= 25), mean interface pressures at the sacrum and trochanter in supine position (44.7±11.7mmHg) and 90° side lying position (48.4±16.3mmHg) were significantly higher than in 30° side lying position (29.5±10.4mmHg, both p<0.001).[18] (I*ndirect evidence)*
- In healthy volunteers (n=83), interface pressure was lower in the 30° side lying position compared to the 90° side lying position after one hour of loading.[38] (*Indirect evidence)*

Effectiveness for other indirect outcome measures

- In healthy volunteers (n=3), magnetic resonance imaging showed that a tilted lying position was associated with lower strains in muscle and fat than a supine position, with an optimal tilt angle between 20° to 30°.[39] (*Indirect evidence)*

Potential adverse effects
None relevant

Strength of Evidence: C – mixed evidence – mixed findings

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ *Not sub-stantial* ☐ *Probably not sub-stantial* ☐ *Probably sub-stantial* ☐ *Sub-stanital* ☐ *Varies* ☐	• One study found that using the 30° side lying position and repositioning every three hours at night required less nursing time over four weeks (6.1 mins fewer, 95% CI -3.71 to-8.48, p=0.001) and had lower costs per patient/day over four weeks (€2.39 less, p=0.001) compared to using 90° side lying position and repositioning every six hours at night. Projected annual cost saving from using 30° side lying position and repositioning every three hours was €512,800 for a 588 bed aged care facility calculated in UK dollars in mid-2009.[35] (*Moderate quality economic analysis*)	
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ *Probably No* ☐ *Uncertain* ☒ *Probably Yes* ☐ *Yes* ☐ *Varies* ☐	In individuals in acute care (n=46), individuals using 30° side lying position reported greater difficulty in positioning due to joint stiffness, pain and anxiety compared to those using and 13% using 90° side lying position.[36] (*Level 1, low quality*)	
	Is the option a priority for key stakeholders?	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☐ *Yes* ☒ *Varies* ☐	76.2% (292/383) 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 positioning in a bed or chair is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning in a bed or chair is important or very important in caring for their family member/friend with or at risk of a pressure injury. Preventing a pressure injury was a care goal for 68.9% of patients and 65.2% of informal caregivers.[11,12] (*Indirect evidence*)	
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ *Probably No* ☐ *Uncertain* ☒ *Probably Yes* ☐ *Yes* ☐ *Varies* ☐	In individuals in acute care (n=46), difficulties repositioning (including getting into and remaining in position) were reported for 78% of individuals using 90° side lying position and 13% using 30° side lying position.[36] (*Level 1, low quality*)	

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☒	Desirable consequences *probably outweigh* undesirable consequences in most settings ☐	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☐	Weak positive recommendation: Probably do it ☒	Strong positive recommendation: Definitely do it ☐
Justification	The evidence comparing side lying positions is mixed. A moderate quality Level 1 study[35] reported use of repositioning regimen that included the 30° side lying position was associated with a significant reduction in pressure injury incidence. People who were positioned using a 90° side lying position were 3.7 times more likely to experience a pressure injury than those who were positioned using a 30° side lying position (OR = 0.27).[35] A low quality Level 1 study found no significant difference in pressure injury rates between the two positions. A moderate[37] quality Level 4 study indicated that the 30° side lying position was associated with lower mean skin temperature over the trochanter than in the 90° side lying position. A low[17] quality Level 4 study indicated that the interface pressure was significant lower in the 30° side lying position compared to the 90° side lying position. A moderate quality economic analysis indicated that a repositioning intervention that used a 30° side lying position and three hourly repositioning was associated with lower costs than a repositioning intervention that used a 90° side lying position with six hourly repositioning.[35] Individuals and their caregivers rated positioning in bed as a high priority education topic.[11]				

Clinical question What positioning techniques are most effective in redistributing pressure and preventing shear?

Recommendation 5.9 **Keep the head of bed as flat as possible.**

Option: Head of bed elevated to maximum of 30°
Comparison: Head of bed raised to angles greater than 30°

Background: Using an optimal position is critical to preventing pressure injuries. Although raising the head of the bed may be more functional for the individual (e.g., at meal times) or more comfortable, raising the head of the bed is considered to increase interface pressure at the sacrum and coccyx.

BENEFITS & HARMS OF THE PRACTICE

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
What is the overall certainty of the evidence?	*No included studies* ☐ | *Very low* ☒ | *Low* ☐ | *Moderate* ☐ | *High* ☐	**Effectiveness in reducing pressure injury incidence** • Intubated individuals considered at high risk of pressure injuries (n=11) who were followed for two days experienced no pressure injury on a low air loss mattress with head of the bed at 30° on one day, and 45° on the next day.[40] (*Level 1, low quality*) **Related pressure injury incidence** • In an intensive care unit (ICU) (n=25), hospital acquired pressure injury incidence was 9.1% when limiting the head of bed elevation to 30° or less for a mean duration of 10 days.[41] (*Level 4, high quality*) **Evidence for effect of raising the head of bed on interface pressure** • In intubated individuals in an ICU (n=133), mean interface pressure decreased significantly (p<0.001) at the scapulas as the head of bed elevation angle increased (approximate reduction of 0.09 to 0.42mmHg/1° increase in elevation), and there was no significant change in interface pressure at the trochanters or sacrum.[42] (*Indirect evidence*) • In individuals in long term care (n=42), mean peak interface pressure at the sacrum was significantly greater with head of bed elevation at 30° (50.4±3.6 mmHg), 45° (74.3±5.3 mmHg) and 60° (98.5±7.4) elevations (all p<0.001) compared to a flat position (38.6±2.5 mmHg).[43] (*Indirect evidence*) • In healthy volunteers (n=50), there was a significant increase in peak interface pressure and average pressure across the whole body, sacrum and heels increased with an increase head of bed elevation angle, and peak interface pressure at the scapulas decreased.[44] (*Indirect evidence)* • In healthy volunteers (n=20), a significant increase in peak interface pressure at the sacrum was associated with increasing head of bed elevation to 45° (p<0.001).[45] (*Indirect evidence)* • In healthy volunteers (n=37), peak and average interface pressures at the sacrum were significantly higher with head of bed elevation at 30° compared with head of bed elevation of 45°.[46] (*Indirect evidence*) • In healthy volunteers (n=15), there was a significant increase in interface pressures associated with head of bed elevation of 30° when the individual was positioned in the 30° lateral position (p<0.05) compared to a flat bed.[47] (*Indirect evidence*) **Adverse events** • In a surgical ICU (n=15), 20% of intubated individuals with a gastric feeding tube were unable to tolerate head of bed elevation at 45° but tolerated head of bed elevation of 30°.[40] (*Level 1, low quality*) **Strength of Evidence: B1 - Level 1 studies of moderate or low quality providing direct evidence**	In some studies, additional factors in combination with increased head a bed elevation angle influenced interface pressure, including: • Types of support surface[45] • Body mass index (BMI)[44] • Alertness level[44] (*Indirect evidence*)
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☒ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐		
How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐		
How substantial are the undesirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substanital* ☐		
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐		

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ *Not sub-stantial* ☐ *Probably not sub-stantial* ☐ *Probably sub-stantial* ☐ *Sub-stanital* ☐ *Varies* ☐	There is no evidence on resources to implement this intervention.	
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☒ *Yes* ☐ *Varies* ☐	• In an ICU (n=276), compliance with raising the head of bed 30° was 53.6% (SD 26.1%) over 28 days. The main reasons for non-compliance with 30° head of bed elevation were patient care (66.3%), clinical causes (33.2%) and obstacles related to resources (0.5%).[41] (*Level 4, high quality*) • In a surgical ICU (n=15), 20% of intubated individuals with a gastric feeding tube were unable to tolerate head of bed elevation at 45° but tolerated head of bed elevation of 30°.[40] (*Level 1, low quality*)	
	Is the option a priority for key stakeholders?	*No* ☐ *Probably No* ☐ *Uncertain* ☒ *Probably Yes* ☐ *Yes* ☐ *Varies* ☐	76.2% (292/383) 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 positioning in a bed or chair is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning in a bed or chair is important or very important in caring for their family member/friend with or at risk of a pressure injury. There was no information on patient priorities regarding specific positioning techniques.[11,12] (*Indirect evidence*)	
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☒ *Yes* ☐ *Varies* ☐	For most individuals, limiting head of bed elevation to 30° is a feasible intervention to implement. However, some individuals have a medical condition or eating and digestion needs that require a higher head of bed elevation for some or all of the time that reduces the feasibility of the recommendation. (*Expert opinion*)	

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☒	Desirable consequences *probably outweigh* undesirable consequences in most settings ☐	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☒	Weak positive recommendation: Probably do it ☐	Strong positive recommendation: Definitely do it ☐

Justification

A small, low quality Level 1 study[40] reported no new pressure injuries associated with using a head of bed elevation of 30° for one day and 45° for the next day. A small, high quality Level 4 study[41] reported a rate of new pressure injuries of 9.1% when the head of bed was limited to 30° elevation for a median duration of ten days. The inconsistent findings could be related to the study durations.

Indirect evidence reporting interface pressures as an outcome measure were also inconsistent. The largest study showed no increase in interface pressure at the sacrum or trochanters when the head of bed was elevated, and scapula interface pressures decreased as elevation increased.[42] In other studies, as the angle of head of bed elevation increased the interface pressure increased at the sacrum[43-45] and heels[44] and interface pressure decreased at the scapulas.[44] In another study, sacral interface pressure decreased as the angle of head of bed elevation increased.[46] Additional factors to the angle of head of bed elevation, including BMI, alertness and type of support surface, could influence interface pressures and explain variations in the findings in the literature.

A low quality Level 1 study[40] reported that intubated individuals with gastric tubes had better tolerance for a 30° head of bed elevation compared with a 45° head of bed elevation.[40] However, a high quality Level 4 study reported a compliance rate of only 53.6% with limiting the head of bed to a 30° elevation.[41]

Clinical question What positioning techniques are most effective in redistributing pressure and preventing shear?

Recommendation 5.10 **Avoid extended use of prone positioning unless required for management of the individual's medical condition.**

Option: Prone position
Comparison: Other positioning in bed

Background: Individuals who spend time in bed are at increased risk of developing pressure injuries. Some individuals have medical conditions that require use of prone position, and the prone position is often required in surgical settings

BENEFITS & HARMS OF THE RECOMMENDED PRACTICE

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS
What is the overall certainty of the evidence of effectiveness?	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐	**Evidence for effect of prone versus other positions on pressure injury incidence** • For individuals with severe acute respiratory distress syndrome (ARDS; n=466), prone position was associated with a lower incidence of pressure injuries compared with supine position at seven days (57.1 versus 42.5, p=0.005). Incidence of new pressure injuries was significantly higher in prone group when measured by days in ICU (13.92 vs 7.72 per 1,000 ICU days, p=0.002). However, pressure injury incidence was not significantly different between groups (prone 44.4% versus supine 37.8%, p=0.151) at discharge from ICU after controlling for confounders.[48] (*Level 1, low quality*)
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☒ | *Probably no important uncertainty or variability* ☐ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐	**Prone positioning and pressure injury development** • In critically ill individuals (n=15) ventilated in a prone position for a mean of 55±7 hours, two patients (13%) developed Category/Stage II facial pressure injuries.[49] (*Level 4, moderate quality*) • In individuals requiring prone positioning in the operating room who used different facial support surfaces (n=66), incidence of facial pressure injuries was 15.1%.[50] *(Level 1, low quality*) • In individuals requiring prone positioning in the operating room who used different facial support surfaces (n=30), 75% experienced non-blanchable erythema of the iliac and chest pressure points immediately after surgery, with between 5% and 10% of pressure injuries persisting at 30 minutes post-operative.[51] (*Level 4, moderate quality*)
How substantial are the desirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☐ | *Probably not substantial* ☒ | *Probably substantial* ☐ | *Substantial* ☐	
How substantial are the undesirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☒ | *Substanital* ☐	**Evidence for effect on interface pressure** • In healthy volunteers (n=83) average interface pressures were lower in prone position compared with 30° side lying position and 90° side lying position.[38] (*Indirect evidence*)
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☒ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	**Potential adverse effects** • In critically ill individuals (n=15) ventilated in a prone position for a mean of 55±7 hours, no individuals experienced ventilation complications. 100% of individuals experienced facial edema.[49] (*Level 4, moderate quality*) **Strength of Evidence: B1 - Level 1 studies of moderate or low quality providing direct evidence**

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	There is no evidence on resources to implement this intervention.	
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	No evidence available	
	Is the option a priority for key stakeholders?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	76.2% (292/383) 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 positioning in a bed or chair is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning in a bed or chair is important or very important in caring for their family member/friend with or at risk of a pressure injury. Preventing a pressure injury was a care goal for 68.9% of patients and 65.2% of informal caregivers.[11,12] (*Indirect evidence*)	
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☒	For most individuals, limiting time spent in a prone position is a feasible intervention to implement. However, some individuals have medical conditions that require use of prone position, and the prone position is often required in surgical settings, reducing the feasibility of the recommendation. (*Expert opinion*)	

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☒	Desirable consequences *probably outweigh* undesirable consequences in most settings ☐	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☒	Weak positive recommendation: Probably do it ☐	Strong positive recommendation: Definitely do it ☐
Justification	One low quality Level 1 study[48] reported increases in pressure injury incidence in the prone position. In this study,[48] conducted in critically ill individuals, there was higher incidence of pressure injuries in prone position compared to supine position based on days in intensive care and days using mechanical ventilation; however when controlling for confounders the difference was not significant. One low quality Level 1 study,[50] and two moderate quality Level 4 studies[49,51] reported incidence of pressure injuries experienced in the prone position was between 5% and 15% in critically ill individuals or individuals positioned in prone for surgical interventions. Understanding the influence of positioning on pressure injuries is considered an important topic by individuals and their informal caregivers. However, other factors, including medical condition or surgical procedure, influence the need to use prone positioning. Use of appropriate support surfaces and pillows[50] and repositioning as soon as feasible is important when the prone position cannot be avoided.				

Clinical question What positioning techniques are most effective in redistributing pressure and preventing shear?

Recommendation 5.11 **Promote seating out of bed in an appropriate chair or wheelchair for limited periods of time.**

Option: Sitting up in bed
Comparison: Sitting up in an appropriately fitted chair with a support cushion.

Background: Seating the individual out of bed for periods of time is an alternative can be an alternative to lying in bed with limited head of bed elevation.

BENEFITS & HARMS OF THE PRACTICE

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
What is the overall certainty of the evidence?	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐	**Evidence for pressure injury incidence** • For individuals who had undergone orthopedic surgery (n=57), limiting the duration of a session of sitting out of bed on a support cushion to two hour sessions was associated with significantly fewer pressure injuries than unlimited period (median of six hours) of time spent sitting out of bed (7% versus 63%, p<0.001).[52] (*Level 1, low quality*)	
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☒ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐		
How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐	**Adverse events** Pressure injuries occurred in 7% of individuals who sat of bed for a maximum session of two hours.[52] (*Level 1, moderate quality*)	
How substantial are the undesirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substanital* ☐		
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | Varies ☐	**Strength of Evidence: B1 - Level 1 studies of moderate or low quality providing direct evidence**	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ *Not sub-stantial* ☐ *Probably not sub-stantial* ☐ *Probably sub-stantial* ☐ *Sub-stanital* ☐ *Varies* ☐	There is no evidence on resources to implement this intervention.
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ *Probably No* ☐ *Uncertain* ☒ *Probably Yes* ☐ *Yes* ☐ *Varies* ☐	In an ICU (n=276), compliance with raising the head of bed 30° was 53.6% (SD 26.1%) over 28 days.[41] Sitting out of bed offers an alternative to raising the head of bed, but compliance with this alternative was not evaluated in the study (*Level 4, high quality*)
	Is the option a priority for key stakeholders?	*No* ☐ *Probably No* ☐ *Uncertain* ☒ *Probably Yes* ☐ *Yes* ☐ *Varies* ☐	76.2% (292/383) 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 positioning in a bed or chair is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning in a bed or chair is important or very important in caring for their family member/friend with or at risk of a pressure injury. Preventing a pressure injury was a care goal for 68.9% of patients and 65.2% of informal caregivers.[11,12] (*Indirect evidence*)
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☐ *Yes* ☐ *Varies* ☒	Sitting out of bed may not be feasible for all individuals. For individuals with existing pressure injuries on the sacrum or coccyx, avoiding pressure from sitting directly on the pressure injury is suggested. (*Expert opinion*).

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☐	Desirable consequences *probably outweigh* undesirable consequences in most settings ☒	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☐	Weak positive recommendation: Probably do it ☒	Strong positive recommendation: Definitely do it ☐
Justification	A low quality Level 1 study[52] showed that limiting the duration of sitting sessions to a maximum of two hours for individuals at high risk of pressure injuries can reduce the incidence of pressure injuries compared with allowing individuals to sit out of bed for an unlimited duration. If an individual has an ischial pressure injury, sitting out of bed should be considered cautiously.				

Clinical question What positioning techniques are most effective in redistributing pressure and preventing shear?

Recommendation 5.12 **Select a reclined seated position with the individual's legs elevated. If reclining is not appropriate or possible, ensure that the individual's feet are well-supported on the floor or on footrests when sitting upright in a chair or wheelchair.**

Option: Reclined seating position
Comparison: Upright seating position

Background: Seating the individual out of bed for periods of time is an alternative; however, a seated position that reduces interface pressure and shear could reduce the risk of pressure injuries.

BENEFITS & HARMS OF THE PRACTICE

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
What is the overall certainty of the evidence?	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐	**Effect on pressure injury incidence** None available **Effect on skin perfusion** In individuals with SCI, ischial tuberosity skin perfusion showed significant increase at 15°, 25°, and 35° tilt-in-space when combined with 120° recline (p<0.01).[53] (*Level 4, low quality*) **Effect on interface pressure** • In healthy volunteers (n=56), mean sacral pressure when reclined with legs elevated was significantly lower than when seated upright with feet on the ground (average 37.9mmHg versus 51.4mmHg (p<0.0001), regardless of the seating surface.[54] (*Indirect evidence*) • In healthy volunteers (n=23), elevating the legs in a reclined position was associated with a lower average and maximum sacral interface pressure than sitting in an upright position.[55] (*Indirect evidence*) • In healthy volunteers (n=16), peak interface pressure at the back, sacrum and ischial tuberosities were significantly lower when positioned with the backrest of the wheelchair pushed backward to reach a 150° recline compared with more upright positions.[56] (*Indirect evidence*) • In individuals with spinal cord injury (SCI, n=18), tilt angles above 30° significantly reduced sacral interface pressure (p<0.0001 to 0.002) compared with more upright positions.[57] (*Indirect evidence*) • In individuals with SCI (n=13), there was a significantly lower ischial tuberosity interface pressure at 30° recline compared to 10° recline at tilt angles of 15°, 25° and 35°. There was also significant decrease in coccyx interface pressure at 30° recline compared to 10° recline, but only at tilt of 35° [58] (*Indirect evidence*) **Effect on shear force** In healthy volunteers (n=17), elevating the legs was associated with higher sacral horizontal force, regardless of level of seat recline.[59] (*Indirect evidence*) **Adverse events** None reported **Strength of Evidence: B2 - Level 3 or 4 studies (regardless of quality) providing direct evidence**	Body mass index (BMI) in combination with the elevation of legs may influenced interface pressure[55] (*Indirect evidence)*
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☒ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐		
How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐		
How substantial are the undesirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substanital* ☐		
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | Varies ☐		

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ *Not sub-stantial* ☐ *Probably not sub-stantial* ☐ *Probably sub-stantial* ☐ *Sub-stanital* ☐ *Varies* ☐	There is no evidence on resources to implement this intervention.	
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ *Probably No* ☐ *Uncertain* ☒ *Probably Yes* ☐ *Yes* ☐ *Varies* ☐	No evidence available	
	Is the option a priority for key stakeholders?	*No* ☐ *Probably No* ☐ *Uncertain* ☒ *Probably Yes* ☐ *Yes* ☐ *Varies* ☐	76.2% (292/383) 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 positioning in a bed or chair is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning in a bed or chair is important or very important in caring for their family member/friend with or at risk of a pressure injury. Preventing a pressure injury was a care goal for 68.9% of patients and 65.2% of informal caregivers.[11,12] (*Indirect evidence*)	
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ *Probably No* ☐ *Uncertain* ☐ *Probably Yes* ☒ *Yes* ☐ *Varies* ☐	Appropriate seating options that enable recline may not be available in all clinical or geographic regions. (*Expert opinion*)	

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☐	Desirable consequences *probably outweigh* undesirable consequences in most settings ☒	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☐	Weak positive recommendation: Probably do it ☒	Strong positive recommendation: Definitely do it ☐
Justification	A low quality Level 4 study[53] provided evidence that skin perfusion significantly increases when tilt-in-space is combined with a reclined position. Additional indirect evidence from two studies conducted in individuals with SCI[57,58] and two studies[54,55] conducted in healthy volunteers demonstrated that interface pressure at the sacrum is significantly lower when a reclined seating position is adopted. Supporting the individual's feet prevents sliding down in the chair and slouching, which indirect evidence indicated were both associated with increased pressure.[54]				

Clinical question What positioning techniques are most effective in redistributing pressure and preventing shear?

Recommendation 5.13 **Tilt the seat to prevent the individual sliding forward in the chair or wheelchair.**

Option: Tilted seating
Comparison: Sitting upright

Background: Seating the individual out of bed for periods of time is an alternative; however, a seated position that reduces interface pressure and shear could reduce the risk of pressure injuries.

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
BENEFITS & HARMS OF THE PRACTICE	**What is the overall certainty of the evidence?**	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐	**Effect on pressure injury incidence** None available **Effect on skin perfusion** In individuals with SCI (n=11), ischial tuberosity skin perfusion showed significant increase at 15°, 25°, and 35° tilt-in-space when combined with 120° recline (p<0.01).[53] (*Level 4, low quality*) **Effect on interface pressure** • In individuals with spinal cord injury (SCI, n=18), tilt angles of the seat that were above 20° significantly reduced interface pressure at the ischial tuberosities (F(4,17)=165.1 to 202.7, p<0.001) with each successive tilt producing greater relative interface pressure reduction.[57] (*Indirect evidence*) • In individuals with SCI (n=18), tilt angles above 30° significantly reduced sacral interface pressure (p<0.001 to 0.002).[57] (*Indirect evidence*) • In individuals with SCI (n=13), tilt angle of 35° was associated with a significantly lower ischial interface pressure than 15° recline with 10° recline, but not when recline was increased to 30°.[58] (*Indirect evidence*) • In individuals with SCI (n=13), tilt angle of 35° was associated with a significantly lower coccygeal interface pressure than 15° recline with 30° recline, but not when recline was 10°.[58] (*Indirect evidence*) **Adverse events** None reported **Strength of Evidence: B2 - Level 3 or 4 studies (regardless of quality) providing direct evidence**	
	Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☒ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐		
	How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐		
	How substantial are the undesirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substanital* ☐		
	Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | Varies ☐		

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	There is no evidence on resources to implement this intervention.
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	No evidence available.
	Is the option a priority for key stakeholders?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	76.2% (292/383) 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 positioning in a bed or chair is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning in a bed or chair is important or very important in caring for their family member/friend with or at risk of a pressure injury. Preventing a pressure injury was a care goal for 68.9% of patients and 65.2% of informal caregivers.[11,12] (*Indirect evidence*)
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☒	Tilting the seating angle may not be feasible for all individuals because appropriate seating options may not be available (*Expert opinion*).

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings	Undesirable consequences *probably outweigh* desirable consequences in most settings	The balance between desirable and undesirable consequences *is closely balanced or uncertain*	Desirable consequences *probably outweigh* undesirable consequences in most settings	Desirable consequences *clearly outweigh* undesirable consequences in most settings
	☐	☐	☐	☒	☐
Strength of recommendation	Strong negative recommendation: Definitely don't it	Weak negative recommendation: Probably don't do it	No specific recommendation	Weak positive recommendation: Probably do it	Strong positive recommendation: Definitely do it
	☐	☐	☐	☒	☐
Justification	A low quality Level 4 study[53] provided evidence that skin perfusion significantly increases when tilt-in-space is combined with a reclined position. Indirect evidence[57,58] also indicates that interface pressure at the sacrum, ischial tuberosities and coccyx is reduced when the seating surface is tilted, with more significant reductions in pressure attained with tilts of at least 30°. Shear forces from sliding forward in the chair or wheelchair are likely to bed reduced when the individual is tilted to the rear.				

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

Recommendation 5.14 Teach and encourage individuals who spend prolonged durations in a seated position to perform pressure relieving maneuvers.

Option: Performing pressure relief maneuvers
Comparison: No pressure relief maneuvers

Background: Pressure relieving maneuvers include intentional exercises, as well as weight shifting that occurs during functional activities (e.g., during leaning, reaching and propelling a wheelchair).

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE
BENEFITS & HARMS OF THE PRACTICE	**What is the overall certainty of the evidence?**	*No included studies* ☐ | *Very low* ☐ | *Low* ☒ | *Moderate* ☐ | *High* ☐	**Evidence for reduction in pressure injury incidence** •In individuals with spinal cord injury (SCI) for more than two years (n=29), those who did not experience a history of pressure injuries performed weight shifts significantly more often than those who experienced a pressure injury (2.5 times/hour versus 1.0 times/hour, p=0.037, effect size = 0.39)[60] (*Level 4, low quality*). •In individuals with SCI (n=61), there was no significant difference in number of pressure relief maneuvers performed per hour between those who did and did not experience a pressure injury (2.2±3.3 vs 1.8±1.6, p=0.664)[61] (*Level 3, high quality*). •In individuals SCI for more than two years (n=29), those who did not experience a history of pressure injuries performed in-seat movements non-significantly more often than those who experienced a pressure injury (46.5 times/hour versus 39.6 times/hour, p=0.352, effect size = 0.17)[60] (*Level 4, low quality*) •In individuals with SCI (n=61), those who did not experience a pressure injury knew more techniques for relieving pressure number of pressure relief maneuvers performed per hour between those who did experience a pressure injury (2.4±1.4 vs 1.3±0.6, p<0.0001)[61] (*Level 3, high quality*).
	Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☐ | *No important uncertainty or variability* ☒ | *No known undesirable outcomes* ☐	**Evidence for increase in blood flow/tissue oxygenation** •In individuals with SCI (n=17) weight shifts involving intermediate or full lean either frontwards or sideward were associated with significant increases in blood flow (p<0.00 for all positions)[62] (*Level 4, moderate quality*). •In individuals with SCI (n=20), who performed s regimen of pushups, transcutaneous oxygen flow increased significantly compared to the sitting position (p<0.001). (*Level 4, moderate quality*).
	How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐	**Evidence for reduction in interface pressure** •In individuals with SCI (n=17) weight shifts involving intermediate or full lean either frontwards or sideward were associated with significant decreases in ischial interface pressure (p<0.00 for all positions)[62] (*Indirect evidence*).
	How substantial are the undesirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☐ | *Probably not substantial* ☒ | *Probably substantial* ☐ | *Substanital* ☐	**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, inconsistency in results**
	Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	No evidence available
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☒ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	No evidence available
	Is the option a priority for key stakeholders?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	76.24% (292/383) 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 how and when to reposition themselves was an important or very important information topic. In the same survey, 69.76% (593/850) of informal caregivers believed that knowing more about what how and when to reposition is an important or very important in caring for their family member/friend with or at risk of a pressure injury.[11,12] (*Indirect evidence*)
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐	The ability to perform pressure relief maneuvers is varied between different individuals. For individuals who are physically able to weight shift, it is feasible to teach these skills in most clinical settings (Expert opinion).

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings	Undesirable consequences *probably outweigh* desirable consequences in most settings	The balance between desirable and undesirable consequences *is closely balanced or uncertain*	Desirable consequences *probably outweigh* undesirable consequences in most settings	Desirable consequences *clearly outweigh* undesirable consequences in most settings
	☐	☐	☐	☒	☐
Strength of recommendation	Strong negative recommendation: Definitely don't it	Weak negative recommendation: Probably don't do it	No specific recommendation	Weak positive recommendation: Probably do it	Strong positive recommendation: Definitely do it
	☐	☐	☐	☒	☐
Justification	Evidence from a moderate quality Level 2[63] and 4 studies[62] shows that performing intermediate of full leans while seated in a wheelchair significantly increases ischial blood flow. However, the evidence[60,61] on an association between performing pressure relieving maneuvers and experiencing a pressure injury is mixed and does not include any comparative intervention studies. In one low quality Level 4 study[60] individuals with spinal cord injury (SCI) who did not experienced pressure injuries performed significantly more weight shifts per hour (effect size 0.39) than individuals who experienced a pressure injury, but in the same study[60] there was no significant relationship between frequency of in-seat movements and experiencing a pressure injury. Additionally, a high quality Level 3 study[61] showed no significant relationship between pressure relief maneuvers and experiencing a pressure injury**.**				

Clinical question Do programs of early mobilization affect pressure injury rates?

Recommendation 5.15 **Implement an early mobilization program that increases activity and mobility as rapidly as tolerated.**

Option: Early mobilization
Comparison: No intervention

Background: Pronged lying predisposes an individual to pressure injuries. Positioning to reduce pressure and shear, in addition to regular repositioning are a priority in the prevention of pressure injuries.

BENEFITS & HARMS OF THE RECOMMENDED PRACTICE

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
What is the overall certainty of the evidence of effectiveness?	*No included studies* ☐ | *Very low* ☒ | *Low* ☐ | *Moderate* ☐ | *High* ☐	**Evidence for pressure injury incidence** • In individuals in neurological critical care (637), a mobilization program was associated with significantly fewer facility-acquired pressure injuries than standard care (1.1% versus 3.8%, p=0.026).[64] (*Level 2, low quality*) • In medical units evaluating an early mobility program (n=521 beds), the incidence of unit-acquired pressure injuries was not significantly changed between pre- (mean 0.33±0.58/month) and post (mean 0.28±0.49/month) intervention.[65] (*Level 2, low quality*) • Following the introduction of a mobility team in medical ICU (n=3,233), there was a significant reduction of the incidence of hospital-acquired pressure injuries (9.2% versus 6.1%, p= 0.0405).[66] (*Level 2, low quality*) • In a surgical ICU implementing an early mobilization program, the pre implementation group developed fewer unit-acquired pressure injuries compared to the post implementation group (3.6% versus 7.4%). This pre-implementation group also had fewer hospital-acquired pressure injuries that the post-implementation group (5.4% versus 6.1%). When accounting for increased length of stay for post-group, the intervention was significantly associated with an increase in pressure injuries (p=0.009).[67] (*Level 2, moderate quality*)	Variation findings may relate to differences in populations (e.g, severity or illness, puressure injury risk) and the interventions used
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☒ | *No important uncertainty or variability* ☐ | *No known undesirable outcomes* ☐		
How substantial are the desirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☒ | *Substantial* ☐		
How substantial are the undesirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substanital* ☐	**Potential adverse effects** • Two minor incidents (disconnection of intravenous or transcutaneous wires) occurred in association with an early mobility program.[66] (*Level 2, low quality*) • There was a reduction in falls observed medical units evaluating an early mobilization program (pre-intervention mean 4.33±3.21/month versus post-intervention mean 3.14±2.34).[65] (*Level 2, low quality*)	
Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐	**Strength of Evidence: C - A body of evidence with inconsistencies that cannot be explained, reflecting genuine uncertainty surrounding the topic**	

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	• One reported early mobilization program required employment of a nursing technician for 12 hours/ day to assist registered nurses to deliver the intervention.[68] (*Moderate quality economic analysis*) • A cost evaluation[68] of a previously described[69] and clinically evaluated[67] early mobility program found staffing costs of $540/day (USD in 2013), which amounted to approximately $15,500 to deliver the program in an 18-bed surgical ICU for 3 months. Because there was no reduction in either pressure injuries or length of stay, no cost avoidance was achieved.[68] (*Moderate quality economic analysis*)
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐	• In one study, 97% of individuals who received an early mobility intervention (n=213) responded to survey, 64% response) were satisfied with the program.[66] (*Level 2, low quality*)
	Is the option a priority for key stakeholders?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	• In a survey of patient consumers and their informal caregivers on care goals and topics of importance on which to receive information, early mobilization was not identified. However, 76.2% (292/383) patient consumers believed information about repositioning was important or very important, as did 69.8% (593/850) of informal caregivers.[11,12] (*Indirect evidence*) • In a surgical ICU, 71% of health professionals adhered to delivery of an early mobilization program when provided with verbal encouragement.[67] (*Level 2, moderate quality*)
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐	One early mobility program required a 20-minute program to be delivered three times daily (i.e., 60 minutes/day/person). This required employment of a nursing technician for 12 hours/day in an 18-bed unit.[67-69]

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings	Undesirable consequences *probably outweigh* desirable consequences in most settings	The balance between desirable and undesirable consequences *is closely balanced or uncertain*	Desirable consequences *probably outweigh* undesirable consequences in most settings	Desirable consequences *clearly outweigh* undesirable consequences in most settings
	☐	☐	☐	☒	☐
Strength of recommendation	Strong negative recommendation: Definitely don't it	Weak negative recommendation: Probably don't do it	No specific recommendation	Weak positive recommendation: Probably do it	Strong positive recommendation: Definitely do it
	☐	☐	☐	☒	☐

Justification

Two low quality Level 2 studies[64,66] reported significant reduction in unit-acquired pressure injuries associated with early mobilization programs. In these studies, there was a reduction of about 2-3% in the unit-acquired pressure injury rates after introduction of the mobility programs. However, a moderate quality Level 2 study[67] reported significant increase in unit and facility acquired pressure injury rates associated with an early mobilization program, and another low quality Level 2 study[65] reported an early mobilization program had no impact on pressure injury rates. Three of the reported mobilization programs incorporated individualized, tolerance-based, assisted mobilization and exercise and were conducted in units with high patient acuity.[64,66,67] The fourth intervention (delivered in a general medical unit) appeared to focus on providing individuals with encouragement to engage in mobility activities.[65] Evaluation of resources required to deliver an early mobility program in an 18-bed high acuity unit estimated costs of 12 nurse technician hours/day (plus staff education costs).[68] Early mobilization programs were associated with high patient satisfaction[66] and high staff adherence,[67] and individuals and their informal caregivers rated receiving information about positioning as a priority topic.

Clinical question	What are the unique pressure injury treatment strategies for individuals with spinal cord injury?
Good Practice Statement 5.16	**For individuals with an ischial or sacral pressure injury, evaluate the benefit of periods of bed rest in promoting healing versus the risk of new or worsening pressure injuries and the impact on lifestyle, physical and emotional health.**

Background: Ideally, ischial pressure injuries should heal in an environment in which the pressure injury is free of pressure and other mechanical stress. However, prolonged bedrest can be detrimental.

SUPPORTING EVIDENCE, WHEN AVAILABLE	
Evidence to support the opinion (when available)	In individuals with limited mobility and Category/Stage III and IV pressure injuries[70] significantly faster healing occurred with sitting out of bed in a tilted wheelchair with a reactive pressure redistribution cushion for up to four hours daily compared to confinement to bed rest on either a foam overlay or low-air-loss bed (*Level 1, moderate quality*).
Justification	Ideally, ischial pressure injuries should heal in an environment in which the pressure injury is free of pressure and other mechanical stress. However, prolonged bedrest can have detrimental impact on the individual's physical health, as well as social, psychological and financial needs. One moderate quality Level 1 study[70] has shown that healing can be attained in carefully selected individuals under conditions of precise seating surface prescriptions.

Clinical question	What are the unique pressure injury treatment strategies for individuals with spinal cord injury?
Good Practice Statement 5.17	**Reposition unstable critically ill individuals who can be repositioned using slow, gradual turns to allow time for stabilization of hemodynamic and oxygenation status.**

Background: Repositioning critically ill individuals can be complicated due to high disease burden, multiple competing care priorities and the use of medical equipment that increase immobility, or difficulty to fully reposition.

SUPPORTING EVIDENCE, WHEN AVAILABLE	
Evidence to support the opinion (when available)	Consensus recommendations[71] suggest that slow and gradual turns can be used to reposition critically ill individuals despite hemodynamic instability that can occur with mobilization in this population.
Justification	Turning the individual more slowly or in small increments allows adequate time for stabilization of vital signs. Slow gradual turns or incremental turns should allow the individual time to return to a baseline hemodynamic status as determined by response of the systolic, diastolic or mean arterial pressure, oxygenation saturation and/or heart rate.

Clinical question	What are the unique pressure injury treatment strategies for individuals with spinal cord injury?
Recommendation 5.18	**Initiate frequent small shifts in body position for critically ill individuals who are too unstable to maintain a regular repositioning schedule, and to supplement regular repositioning.**

Option: Repositioning using small body shifts for individuals in critical care who are too medically unstable to reposition using standard procedures

Comparison: Repositioning using large body shifts or not repositioning individuals in critical care who are too medically unstable to reposition using standard procedures

Background: Repositioning critically ill individuals can be complicated due to high disease burden, multiple competing care priorities and the use of medical equpiment that increase immobility, or difficulty to fully reposition.

BENEFITS & HARMS OF THE RECOMMENDED PRACTICE

CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE
What is the overall certainty of the evidence of effectiveness?	*No included studies* ☐ · *Very low* ☒ · *Low* ☐ · *Moderate* ☐ · *High* ☐	**Evidence for reducing interface pressure** • In older adults, repositioning in the lateral oblique position using small body weight shifts was associated with significant reduction in interface pressure at the trochanter ($F(1.75, 85.79) = 5.36$, $p<0.01$).[72] (*Indirect evidence*) • In older adults, repositioning in the supine position using small body weight shifts was associated with significant reduction in interface pressure at the sacrum ($F(1.38, 67.64) = 3.90$, $p<0.05$).[72] (*Indirect evidence*) • In healthy people, interface pressure was significantly reduced by 1.3 to 3.9mmHg in 28 different positions when repositioned using small postural changes ($p<0.05$).[73] (*Indirect evidence*) **Evidence for promoting blood flow** • In older adults, repositioning in the lateral oblique position using small body weight shifts was associated with significant increase in capillary perfusion measured at both the trochanter and sacrum in the the supine position only $F(1.24, 60.54)=4.85$, $p<0.05$.[72] (*Indirect evidence*) **Potential adverse events** Adverse effects of repositioning using small body shifts were not reported.
Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ · *Possibly important uncertainty or variability* ☐ · *Probably no important uncertainty or variability* ☐ · *No important uncertainty or variability* ☒ · *No known undesirable outcomes* ☐	
How substantial are the desirable anticipated effects?	*Unclear* ☒ · *Not substantial* ☐ · *Probably not substantial* ☐ · *Probably substantial* ☐ · *Substantial* ☐	
How substantial are the undesirable anticipated effects?	*Unclear* ☒ · *Not substantial* ☐ · *Probably not substantial* ☐ · *Probably substantial* ☐ · *Substanital* ☐	
Do the desirable effects outweigh the undesirable effects?	*No* ☐ · *Probably No* ☐ · *Uncertain* ☒ · *Probably Yes* ☐ · *Yes* ☐ · *Varies* ☐	**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.**

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	There is no evidence on the resource requirements for repositioning using small, gradual body weight shifts.	
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☒ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	No evidence available	
PRIORITY AND ACCEPTABILITY	**Is the option a priority for key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☒ | *Yes* ☐ | *Varies* ☐	76.2% (292/383) 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 positioning is important or very important in caring for themselves. In the same survey, 69.8% (593/850) of informal caregivers believed that knowing more about positioning is important or very important in caring for their family member/friend with or at risk of a pressure injury.[11,12] (*Indirect evidence*)	
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	Use of small body shifts in individuals in critical care with hemodynamic instability is feasible to implement and generally does not require specific physical resources.	

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☐	Desirable consequences *probably outweigh* undesirable consequences in most settings ☒	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☐	Weak positive recommendation: Probably do it ☒	Strong positive recommendation: Definitely do it ☐
Justification	The current empirical evidence supporting the evidence-based recommendation consists of studies that support indirectly the benefit of supplementing regular repositioning with frequent small shifts in body weight. The studies demonstrated that small weight shifts redistribute pressure in healthy individuals and in the critically ill population.[72,73] Improvements in sacral blood flow from small weight shifts were demonstrated in critically ill individuals.[72] It is uncertain if the outcome is sufficient to prevent pressure injuries and the overall low volume of evidence precludes the ability to determine if this intervention will have an overall effect on pressure injury prevention or reduction.				

Clinical question	What are the unique pressure injury treatment strategies for individuals in the operating room?
Good Practice Statement 5.19	**Position the individual in such a way as to reduce the risk of pressure injury development during surgery by distributing pressure over a larger body surface area and offloading bony prominences.**

Background: During surgery, the individual is immobilized and areas in contact with the support surface (or other surfaces and body parts) for often extended periods of time. In many cases the individual is unconscious and unable to react. Selecting a position that places less pressure on the skin and tissues and using appropriate padding might reduce pressure injury incidence.

SUPPORTING EVIDENCE, WHEN AVAILABLE

Evidence to support the opinion (when available)	In a laboratory study conducted with healthy volunteers,[38] interface pressure was lowest when an individual was positioned in the supine position, compared to other surgical positions (*Indirect evidence*). In a study with healthy volunteers, curvilinear supine position significantly increased contact with the support surface compared with supine position ($p<0.001$), leading to lower maximum interface pressures at the sacrum and heels ($p<0.001$).[74] (*Indirect evidence*).
Justification	The position during surgery is dictated by surgical needs; however, when possible positions that do not place pressure on bony prominences should be selected. Positioning the individual with padding and support devices might reduce the risk of pressure injury development.

Clinical question What criteria should be used to determine and monitor frequency of turning?

Support surface

Option: Consider the type of support surface when determining repositioning frequency
Comparison: Repositioning on the same regimen regardless of the support surface

Background: Extended periods of lying or sitting on a particular part of the body and failure to redistribute the pressure on the body surface can result in sustained deformation of soft tissues, ischemia and tissue damage.[75] Repositioning reduces the pressure experienced by the parts of the body.

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	**What is the overall certainty of the evidence of effectiveness?**	*No included studies* ☐ | *Very low* ☐ | *Low* ☐ | *Moderate* ☒ | *High* ☐	**Evidence for pressure injury incidence** • In nursing home residents (n=838), turning an individual every four hours on viscoelastic foam mattresses resulted in statistically fewer Category/Stage II or greater pressure injuries compared to turning every two or three hours on a non-pressure redistributing mattress (OR = 0.12; 95% CI 0.03 to 0.48)[75] (*Level 1, moderate quality*). • For individuals in surgical, medical and geriatric wards (n=447), not implementing any repositioning with an alternating pressure air overlay (15.3%) and implementing 4-hourly repositioning with a high specification foam mattress (15.6%) were not significantly different for reducing pressure injury incidence (p=1.00).[76] (*Level 1, moderate quality*) **Potential adverse effects** None relevant **Strength of Evidence: B1 - Level 1 studies of moderate or low quality providing direct evidence**	• Mattresses used in these early studies may not reflect current clinical practice.
	Is there important uncertainty about how much people value the main outcomes?	*Important uncertainty or variability* ☐ | *Possibly important uncertainty or variability* ☐ | *Probably no important uncertainty or variability* ☐ | *No important uncertainty or variability* ☒ | *No known undesirable outcomes* ☐		
	How substantial are the desirable anticipated effects?	*Unclear* ☒ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☐ | *Substantial* ☐		
	How substantial are the undesirable anticipated effects?	*Unclear* ☐ | *Not substantial* ☐ | *Probably not substantial* ☐ | *Probably substantial* ☒ | *Substanital* ☐		
	Do the desirable effects outweigh the undesirable effects?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐		

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS
RESOURCE USE	**How substantial are the resource requirements?**	*Not clear* ☒ | *Not sub-stantial* ☐ | *Probably not sub-stantial* ☐ | *Probably sub-stantial* ☐ | *Sub-stanital* ☐ | *Varies* ☐	There is no evidence on resource requirements; however, assessing the support surface an individual is using is not anticipated to require extensive resources. (*Expert opinion*)
PRIORITY AND ACCEPTABILITY	**Is the option acceptable to key stakeholders?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☐ | *Varies* ☐	
	Is the option a priority for key stakeholders?	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	76.24% (292/383) 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 how and when to reposition themselves was an important or very important information topic. In the same survey, 69.76% (593/850) of informal caregivers believed that knowing more about what how and when to reposition is an important or very important in caring for their family member/friend with or at risk of a pressure injury.[11,12] (*Indirect evidence*)
FEASIBILITY	**Is the option feasible to implement?**	*No* ☐ | *Probably No* ☐ | *Uncertain* ☐ | *Probably Yes* ☐ | *Yes* ☒ | *Varies* ☐	In most clinical settings it is feasible to assess an individual's support surface before developing a pressure injury prevention plan. (*Expert opinion*)

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ☐	Undesirable consequences *probably outweigh* desirable consequences in most settings ☐	The balance between desirable and undesirable consequences *is closely balanced or uncertain* ☒	Desirable consequences *probably outweigh* undesirable consequences in most settings ☐	Desirable consequences *clearly outweigh* undesirable consequences in most settings ☐
Strength of recommendation	Strong negative recommendation: Definitely don't it ☐	Weak negative recommendation: Probably don't do it ☐	No specific recommendation ☐	Weak positive recommendation: Probably do it ☐	Strong positive recommendation: Definitely do it ☐
Recommendation (text)	**No recommendation**				
Justification	No recommendation was made because the individual's tissue responses should determine the frequency of turning and repositioning on any support surface. Irrespectively from the support surface and the repositioning frequency used, the pressure injury incidence in these studies was high.				

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