FULL BODY SUPPORT SURFACES FOR PREVENTION OF PRESSURE INJURIES

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Introduction

Full body support surfaces are specialized mattresses, overlays and integrated systems that are designed to redistribute pressure, reduce friction and shear, and aid microclimate management, all factors that play a role in pressure injury development.[1]

Pressure redistribution is achieved through envelopment and immersion capabilities. Envelopment is the ability of the support surface to conform to the individual's shape, and immersion is the ability of the individual to penetrate or sink into the support surface. Additionally, some support surfaces have characteristics through which they achieve microclimate management, which refers to control of the humidity/moisture at the interface between the individual and the support surface.[1]

Support surfaces are categorized as active or reactive. An active support surface is a powered support surface with the capability to change its pressure redistribution properties independent of applied load.[1] An alternating pressure support surface is an example of an active surface. A reactive support surface is a powered or non-powered support surface with the capability to change its pressure redistribution properties only in response to an applied load (e.g., an individual lying on the surface). Examples of reactive support surfaces are pressure redistribution foam, static air mattresses and low air loss support surfaces.[1]

The Support Surface Standard Initiative (S3I) of the National Pressure Injury Advisory Panel (NPIAP),[1] and the Rehabilitation Engineering and Assistive Technology Society of North America/American National Standards (RESNA/ANSI) have developed terminology, test methods and reporting standards for support surfaces. The S3I suggest terminology for use to promote a common language when referring to performance characteristics, design features, components and categories. *Table 1* provides an abridged framework from S3I outlining the currently endorsed vocabulary. The full document also includes general terms and engineering terms associated with support surfaces.

Standardized testing of support surfaces is important, because it provides objective data that can assist clinicians to determine whether the characteristics of the support surface are appropriate for the individual's needs and to compare performance between products. RESNA/ANSI has endorsed and published a volume of standards (SS-1) that define vocabulary and test methods for pressure redistributing and microclimate management performance characteristics. In other jurisdictions, similar national standards for support surfaces and assistive devices detail the general requirements (e.g., European Parliament, Australian Rehabilitation and Assistive Technology Association [ARATA], etc.).

Table 1: Extract of S3I terminology[1]

Support surface category	Component/ material	Design features	Performance characteristics
• Active support surface • Reactive support surface	• Air • Cell/bladder • Foam • Gel	• Alternating pressure • Constant/continuous low pressure • Convertible/adaptable • Hybrid • Integrated bed system • Lateral rotation • Low air loss • Multi-zoned surface • Non-powered • Powered • Pulsation • Turn assist • Zone	• Envelopment • Immersion • Microclimate • Pressure Redistribution

Table 2: Selected resources on standards tests for full body support surfaces

- S3I Guidance on Interpretation of Performance Standards for Support Surfaces[2]
- S3I Support Surface Selection Steps: Using Standards to Choose Wisely[3]
- S3I Support Surface Standards Tests for Microclimate Management[4]
- S3I Immersion and Envelopment Performance Tests[5]

Selecting a Full Body Support Surface

Clinical question: What are considerations in ensuring availability and safe use of full body support surfaces for individuals at risk of pressure injuries?

SS1: It is good practice for organizations to maintain an inventory of, or access to, a range of full body support surfaces appropriate to the clinical context. The inventory should be maintained, stored and used in accordance with manufacturer recommendations.

(Good practice statement)

Supporting information

Individuals at risk of PIs have varying clinical needs, preferences and goals of care; therefore, the entity that that provide full body support surfaces should ensure there is access to different full body support surfaces with a range of performance characteristics and design features to address the various and diverse needs of individuals. Policies and procedures should be implemented to ensure that support surfaces provided by the entity meet the relevant ISO standards, are regularly maintained and used safely. Regular inspections should be undertaken to ensure support surfaces are safe for their intended use and within their functional life span. Surfaces and bed frames that do not have pressure redistribution performance characteristics or that require maintenance or that are beyond their functional lifespan should be removed from circulation.

Implementation considerations

- Regularly audit all support surfaces in the organization and ensure they are appropriate for use. Review the testing data to ensure that support surfaces meet pressure redistribution performance criteria. Support surfaces that do not have pressure redistribution performance characteristics should be removed from circulation.
- Align the inventory of support surfaces with the demographics of the individuals using the health service. Where there is a high proportion of individuals at high risk of (or with) a PI, the health service should have a larger range of support surface options and inventory.
- Consider the clinical context when developing an inventory of full body support surfaces. This includes the weight of the bed, structure of the building (e.g., door width) where it will be used, availability of uninterrupted electrical power, appropriate locations for any pump or motor, including any ventilation needs.
- Establish a support surface replacement program to ensure support surfaces that reach their functional age are removed from circulation and replaced.
- Establish contractual support for support surface performance verification (e.g., with the manufacturer) or train staff in the inspection and evaluation of full body support surfaces.[1]
- Ensure that support surfaces are cleaned as recommended by the manufacturer for infection control.
- Ensure that mattresses and overlays are correctly fitted to the bed. Overlays placed on top of existing mattresses can elevate the surface to an unsafe level in relation to the height of side rails. Ensure that the jurisdictional and/or ISO standards for safe side rail height are met.
- Inspect equipment at least daily while in use to ensure safety, functionality and suitability.

Additional considerations for neonates and children

- Ensure mattresses are correctly sized to the bed or crib.
- Ensure the full body support surface meets the jurisdictional standards for safety, including sleep safety.

Additional considerations for individuals living in the community

- Consider the environment before recommending procurement of a full body support surface for the home context. This includes the weight of the bed, structure of the building (e.g., door width) where it will be used, availability of uninterrupted electrical power, appropriate locations for any pump or motor, including any ventilation needs.
- Consider the individual's personal preferences procurement of a full body support surface for the home context. Consider solutions when the individual is sharing their bed with a partner or family members (e.g., safe use of overlays).
- Provide the individual and their informal carers with information about access to maintenance services and requirements for inspecting, maintaining and cleaning the support surface.

Clinical question: What are the general considerations when selecting a full body support surface for individuals at risk of pressure injuries?

SS2: It is good practice to use a full body support surface or integrated bed system that appropriately accommodates the weight, height, size and body mass distribution of the individual.

(Good practice statement)

Supporting information

A full body support surface should appropriately accommodate the individual's size and distribution of mass to ensure its performance characteristics function as intended. A full body support surface should provide adequate width to facilitate repositioning and/or bed mobility, and to promote safety. Consider

the individual's age, and body habitus when selecting a full body support surface within manufacturers' recommendations.

Implementation considerations

- Follow the support surface selection protocol of the health service/organization where available.
- Follow the manufacturer's recommendation for the use of the full body surfaces, including recommendations for the individual's weight, height and dimensions.
- Ensure that the full body support surface is sufficiently wide to allow the individual to safely turn/be repositioned from one side to the other. Be aware of the manual handling risk to the carer (i.e., staff leaning/excessive reaching to care for an individual) when using an extended width full body support surface.
- Ensure there is adequate clearance between the individual and bed rails/sides to avoid device related pressure injuries.
- Check that taller individuals have adequate clearance between their feet and the footboard.

Additional considerations for neonates and children

- Only use the support surface that is fitted in the isolette for neonates (i.e. do not add additional full body support surfaces). Specialist positioning devices might be used for some neonates at high risk of PIs (e.g. micro-premature) for repositioning the head.
- Ensure that the support surface is age appropriate. Support surfaces that are not appropriate for the child's age, weight, dimensions and body proportions may be unsafe and may increase the risk of PIs (e.g. sectioned mattresses).
- Ensure mattresses/overlays are correctly fitted. There is a risk of entrapment when using a poorly fitted full body support surface.

Clinical question: Should pressure redistribution foam (reactive) full body support surfaces versus a non-pressure redistribution foam support surfaces be used to prevent PI occurrence for individuals at risk?

SS3: We recommend using a pressure redistribution foam (reactive) full body support surface for individuals at risk of pressure injuries.

(Strong recommendation, low certainty of evidence)

Evidence summary

A meta-analysis that included six RCTs[6-11] showed that pressure redistribution foam (reactive) full body support surfaces were associated with a non-significant lower rate of PIs (relative risk [RR] 0.36, 95% confidence interval [CI] 0.19 to 0.65, p = 0.14) compared with foam mattresses without pressure redistribution characteristics. This translated to 106 fewer per 1,000 individuals experiencing a PI (from 135 fewer individuals to 58 fewer individuals) when a pressure-redistribution foam (reactive) full body support surface is used. However, the evidence was of low certainty and was downgraded for risk of bias and inconsistency. The studies explored a range of pressure redistribution foam (reactive) mattresses* (circa 1994 to 2003), all of which were and compared to a "standard" polypropylene/vinyl hospital mattress. In most clinical settings, a pressure redistribution foam (reactive) full body support surface is acceptable and feasible to use, although access varies in some low resource settings. Modelling

* Support surfaces reported throughout all the research were considered in this Guideline based on their categorization by the researchers (at the time the research was undertaken). Where available, the product name and characteristics were included in the data extraction tables. Product names/technology may have changed. Due to advances in technology, currently available full body support surfaces in the same category may have different performance characteristics.

conducted in aged care[12] and emergency care[13] demonstrated that changing from foam mattresses with no pressure redistribution properties to pressure-redistribution foam (reactive) full body support surfaces has a high likelihood of being cost effective. The Guideline Governance Group made a strong recommendation despite low certainty of evidence because the risk of harm in not using a full body support surface with pressure redistribution features for individuals at risk of PIs is very high. The current standard of practice requires a pressure redistribution full body support surface for prevention of PIs; further research on this topic using stronger research designs is not appropriate. **In the Guideline Governance Group's expert opinion, a pressure redistribution foam (reactive) full body support surface should be the first support surface of choice for individuals at risk of PIs.**

Implementation considerations

- Identify the types of foam surfaces (pressure redistribution versus non-pressure redistribution) available in the current clinical setting. Staff who are responsible for selecting support surfaces should have a strong understanding of the types of foam support surfaces available in a health service and whether they meet the standards for pressure redistribution.
- Ensure that devices (e.g., interface mapping systems, incontinence aids) and bed linen (e.g., continence management, sheets) that are used between the individual and the support surface do not interfere with the function of the support surface. Ensure linen is applied without any wrinkles. Avoid multiple linen layers under the individual.

Additional considerations for neonates and children

- Use a pressure redistribution foam support surface for children and adolescents at high risk of PIs. Specialized repositioning devices designed for neonates and children are another option that have been associated with reduction in interface pressure;[14] it is uncertain if this translates to reduced PI occurrence.

Changing from a Pressure Redistribution Foam (reactive) Full Body Support Surface

For a variety of clinical and practical reasons, a decision to change from/select an alternate full body support surface may be made. In general, different options should be considered when the individual has a moderate or high risk of PIs, and/or has previously experienced a PI on a pressure redistribution foam (reactive) full body support surface. In addition to pressure redistribution foam (reactive) full body support surfaces, the following surfaces provide pressure redistribution and have been shown to reduce PI incidence in relation to various comparators, including:

- Alternating pressure air (active)
- Air (reactive) (not including low air loss)
- Medical grade sheepskin
- Low air loss (reactive) with microclimate management
- Air fluidized (reactive).

S3I defines microclimate management as "the impact of a support surface on the temperature and humidity/moisture in a specified location at the body interface".[1] Low air loss is defined as a support surface construction that uses a flow of air to assist in pressure redistribution and may assist in managing the heat and humidity (microclimate) of the skin.[1]

The term *low air loss* is consistent with the 2024 S3I definition and with the studies examining full body support surfaces with a low air loss design that were included in the data analysis for this guideline. Therefore, the term is used throughout this document. However, S3I discourages the use of the general term, *low air loss*. Clinicians are encouraged to use the results of standardized performance characteristic test data related to pressure redistribution and microclimate management to make an informed decision based on the risk factors of the individual when selecting a full body support surface, rather than relying on a specific design feature. See www.npiap.com for updates.

Clinical question: What are the general considerations when selecting or changing a full body support surface for individuals at risk of pressure injuries?

SS4: It is good practice to consider the following factors when selecting or changing the mattress, overlay or integrated bed support surface the individual's:

- **overall risk of pressure injuries,**
- **response of the skin and tissues,**
- **independence, mobility and activity needs,**
- **posture and sleeping position and their effects on pressure redistribution,**
- **need for microclimate management and shear reduction features, and**
- **preferences and care goals.**

(Good practice statement)

Supporting information

With a variety of full-body support surfaces available, different performance characteristics should be considered based on the clinical context. A pressure injury risk assessment helps identify specific risks for each individual and guides the selection of an appropriate full body support surface. Additionally, other clinical and functional needs, as well as the individual's preferences, should be considered when making a choice. Ongoing skin and tissue assessments are required to evaluate the effectiveness of the full body support surface. Table 3 provides a general summary of some considerations when evaluating the different full body support surface options against the individual's clinical needs.

Implementation considerations

- Consider the individual's previous response to different full body support surfaces, where this information is available. This can inform the selection of the most appropriate full body support surface to meet the individual's needs.
- Document decisions that inform the selection of the full body support surface.
- Continue regular skin and tissue assessments to identify early signs of skin and tissue damage (e.g., local erythema, hypo/hyperpigmentation in dark skin tones, local edema, increased skin temperature, etc.). If the individual's response on the full body support surface is not as expected, re-evaluate the selection of the support surface and other aspects of the PI prevention plan, including repositioning frequency and effectiveness of various positions.
- Consider the impact of the full body support surface the individual's ability to re-position in the bed and safe egress from the bed.
- Regularly re-evaluate the appropriateness of the selected full body support surface as the individual's clinical condition changes. For example, when an individual transitions to rehabilitation care, the support surface should not be a barrier to increased self-mobilization.

<u>Additional considerations for individuals who have overweight or obesity</u>

- Consider selecting a full body support surface with enhanced pressure redistribution, shear reduction and microclimate management features.

<u>Additional considerations for individuals in end of life or palliative care settings</u>

- Select a full body support surface with consideration to the individual's skin fragility and high risk of pressure injury development. Consider overall goals of care, including comfort.

Table 3: Summary of considerations in selecting a full body support surface

	Features[#]			Clinical considerations and preferences[#]					
	Pressure redistribution	Shear reduction*	Increased microclimate management	Requires continuous power source for a pump or motor	May impact ability to move in bed and/or egress the bed	May cause other discomfort (e.g. motion feeling)	May increase skin drying and dehydration	May increase warmth	May increase comfort
Pressure redistribution foam	✓	*							
Powered air (reactive) (excluding low air loss)	✓	*		✓	✓	✓		✓	
Non-powered air (reactive)	✓	*			✓	✓			
Alternating pressure air (active)	✓	*		✓	✓				
Low air loss (with enhanced microclimate management features)	✓	*	✓	✓	✓	✓	✓		
Medical grade sheepskin (reactive)	✓	*						✓	✓
Air-fluidized (reactive)	✓	*	✓	✓	✓	✓	✓	✓	✓

[#] ***Indicative only***, *some full body support surfaces may have additional features. We recommend always reviewing manufacturers' information and standardized test results.*
**Shear reduction capabilities are dependent on the design and materials of the full body support system*

Clinical question: Should air (reactive) full body support surfaces versus pressure redistribution foam (reactive) full body support surfaces be used to prevent PI occurrence for individuals at risk?

SS5: We suggest using either air (reactive) full body support surfaces or pressure redistribution foam (reactive) full body support surfaces for individuals at risk of pressure injuries.

(Conditional recommendation, very low certainty of evidence)

Evidence summary

A meta-analysis[15] was conducted of four RCTs[16-19] exploring air (reactive) full body support surfaces, excluding studies on low air loss full body support surfaces.[*] The meta-analysis showed that air (reactive) full body support surfaces were associated with a statistically significantly lower rate of PIs (RR 0.42, 95% CI 0.18 to 0.96, p = 0.04) compared with pressure redistribution foam (reactive) full body support surfaces. This translated to 160 fewer per 1,000 individuals experiencing a PI (from 226 fewer individuals to 11 fewer individuals) when an air (reactive) full body support surface is used. However, both support surfaces demonstrated an effect in preventing PIs and the evidence was of very low certainty. Certainty of evidence was downgraded for the risk of bias, indirectness and inconsistency. The studies explored a range of air (reactive) full body support surfaces and compared them to different pressure redistribution foam (reactive) support surfaces (circa 1980 to 2013).[16-19] Undesirable effects were equivocal in studies. The Expert and Consumer Panel Groups noted the risk of undetected deflation of air (reactive) surfaces that can lead to a PI. Some air (reactive) full body support surfaces may be more costly, require more carer time and resources to frequently check, and require a reliable electric supply. This may increase inequities for low resource settings. **The decision to use an air (reactive) full body support surface**

[*] SS11 addresses use of low air loss full body support surfaces.

will depend on the PI risk of the individual, their level of independent mobility in bed, and other clinical needs, availability and feasibility in the specific context and personal preferences.

Clinical question: Should alternating pressure (active) air full body support surfaces versus pressure-redistribution foam (reactive) full body support surfaces be used to prevent PI occurrence for individuals at risk?

SS6: We suggest using either alternating pressure air (active) full body support surfaces or pressure redistribution foam (reactive) full body support surfaces for individuals at risk of pressure injuries.

(Conditional recommendation, low certainty of evidence)

Evidence summary

The meta-analysis[20] of four RCTs[21-24] showed that alternating pressure (active) air full body support surfaces are associated with a statistically non-significant lower rate of PI occurrence (RR 0.63, 95% CI 0.34 to 1.17, p = 0.14). This translated to 39 fewer per 1,000 individuals expected to experience a PI if an alternating pressure air surface is used compared to a pressure redistribution foam (reactive) full body support surface. However, certainty of evidence is low, and the true effect could vary from 69 fewer individuals to 18 more individuals experiencing a PI if an alternating pressure air (active) support surface is used. The evidence was downgraded for risk of bias and imprecision. One RCT[24] determined that alternating pressure air (active) full body support surfaces are probably modestly cost effective compared with pressure redistribution foam (reactive) full body support surfaces when the cost of an individual acquiring a full-thickness PIs was considered. However, certainty of this evidence is very low due to the risk of bias and imprecision. Pressure redistribution foam (reactive) full body support surfaces are effective in preventing PIs in individuals with moderate and high risk in long term care settings when repositioned at regular intervals[25,26] (very low certainty of evidence) and are therefore an acceptable support surface in all settings. The cost of the support surface and availability of a reliable electricity supply may limit the use of powered air surfaces in low resource settings and in some clinical settings (e.g., in the community). In these settings a pressure redistribution foam (reactive) support surface may be used. **Where available, alternating pressure air (active) surfaces may be more clinically effective and cost effective for individuals at the highest PI risk (e.g., individuals in critical care) or for those seeking an alternative support surface option for comfort or when less frequent repositioning is the individual's preferred option (e.g., palliative or end-of-life care).**

Clinical question: Should alternating pressure air (active) full body support surfaces versus air (reactive) full body support surfaces be used to prevent PI occurrence for individuals at risk?

SS7: We suggest using either alternating pressure (active) air or air (reactive) full body support surfaces for individuals at risk of pressure injuries.

(Conditional recommendation, very low certainty of evidence)

Evidence summary

A meta-analysis of five RCTs[27-32] showed that alternating pressure air (active) full body support surfaces are associated with a statistically significant higher rate of PI occurrence (RR 1.81, 95% CI 1.00 to 3.27, p = 0.05) than air (reactive) full body support surfaces. Using an air (reactive) full body support surface (n.b., excluding low air loss full body support surfaces) might reduce the proportion of individuals who develop a new PI compared to an alternating pressure (active) air support surface). The analysis translated to 19 per 1,000 individuals more experiencing a PI with an alternating pressure (active) air full body support surface (from 0 fewer to 52 more). The evidence is very uncertain and was downgraded for the risk of bias and imprecision. There was no data available on potential serious undesirable effects. Comfort level is

reported as similar for alternating pressure (active) and air (reactive) full body support surfaces.[27-29] Powered air support surfaces (either active or reactive) require an initial investment cost and a reliable electricity source, which vary widely across different clinical and geographic contexts. Both alternating pressure (active) and air (reactive) full body surfaces require very regular inspections for function (e.g., checking for deflation) and ongoing maintenance. In addition to resource requirements, the ease with which the individual can reposition and get in and out of the bed, their comfort and preferences, and the care setting should all be considered when making a choice between these two support surface options. Refer to recommendation SS4 for more guidance on considerations when selecting between different full body support surface options. Pressure redistribution foam (reactive) full body support surfaces are often adequate for many individuals at risk of pressure injuries. **Alternating pressure (active) air or air (reactive) full body support surfaces are usually reserved for individuals at higher risk or deteriorating skin condition or clinical condition.**

Implementation considerations

- Consider the individual's clinical needs for pressure redistribution, shear management and microclimate management when selecting between air (reactive) or alternating pressure (active) air full body support surfaces.
- Follow the manufacturer's guidance on minimal and maximum weight and dimensions for the individual when using air (reactive or active) full body support surfaces.
- Inspect the air inflated full body support surfaces before use to ensure proper functioning, including being inflated to a pressure that is appropriate to the weight and shape of the individual based on the manufacturer's instructions.[33] Check the full body support surface for bottoming out. Regularly reinspect the air inflated full body support surface as it may require reinflation or adjustment.
- For powered full body support surfaces, regularly check that the power source is connected, turned on and operating.
- Consider reserving alternating pressure (active) air or air (reactive) full body support surfaces for individuals at higher risk or deteriorating clinical condition or skin condition.

<u>Additional considerations for individuals in palliative or end of life care</u>

- Consider the use of an alternating pressure air (active) surface for individuals in the palliative or end-of life-care settings where this meets their overall goals of care, including comfort.
- Consider the impact of increased noise of powered air full body support surfaces.
- Consider the impact of the cyclic action of alternating pressure (active) air full body support surfaces. The cyclic action may cause waves of high stress concentration in soft tissue, stimulating local nociceptors to signal increase in inflammatory pain.[34,35]

<u>Additional considerations for individuals living in the community</u>

- For powered full body support surfaces, instruct the individual and their informal cares to regularly check that the power source is connected, turned on and operating. Ensure there is an action plan for managing power outages.
- Non-powered options should be preferred in regional areas with unreliable or inconsistent power resources.

<u>Additional considerations for neonates and children</u>

- Do not use an air (reactive or active) full body support surface for neonates and young children.
- Follow the manufacturer's guidance on minimal weight and dimension requirements for air (reactive or active) full body support surfaces. There is no evidence on using (reactive or active) full body support surface for preventing PIs in children, and in most situations, this is not recommended. It may be appropriate for some older adolescents if they meet the minimal weight and dimension requirements.

Clinical question: Should medical grade sheepskins versus any other support surface be used to reduce pressure injury occurrence for individuals at risk?

SS8: We suggest a medical grade sheepskin could be used for individuals at risk of pressure injuries where geographically available. If used, consider the potential impact on the full body support surface.

(Conditional recommendation, very low certainty of evidence)

Clarifiers:

- **A medical grade sheepskin is not recommended when there is a full body support surface with pressure redistribution properties available.**
- **Only medical grade sheepskins should be used. Non-medical grade sheepskins do not have the same microclimate management properties and may increase the risk of PIs.**
- **Ensure that medical grade sheepskin overlays do not interfere with the pressure redistribution properties of the full body support surface.**

Evidence summary

A meta-analysis[36] of three RCTs[37-39] showed that medical grade sheepskins are associated with a non-significant lower rate of PI occurrence (RR 0.59, 95% CI 0.33 to 1.05, p = 0.074) compared with other support surfaces. In the included studies,[37-39] the comparator support surfaces were either not specified or were vinyl mattresses without pressure redistribution properties. Using a medical grade sheepskin might reduce the proportion of individuals who develop a new PI compared to a mattress or overlay without pressure re-distribution features. The analysis translated to 19 per 1,000 individuals fewer experiencing a PI with a medical grade sheepskin (from 31 fewer to 2 more). The evidence is very uncertain and was downgraded for the risk of bias, indirectness and imprecision. No data was available on serious undesirable effects; the literature[37,39] and expert opinion from the Panel Group suggested that undesirable effects are related to discomfort from the warmth of the sheepskin. Medical grade sheepskins are often used in low resource settings, but the costs are not reported and there are no analyses of cost effectiveness. The choice to use a medical grade sheepskin in addition to a support surface with pressure redistribution features should be made in consideration of the access to medical grade products and appropriate laundering facilities,[37] the individual's clinical needs and response to the surface (particularly with respect to microclimate management), and whether the medical grade sheepskin is comfortable and acceptable to in the individual.

Implementation considerations

- Use only medical grade sheepskins manufactured to Australian Standard AS4480.1. Synthetic products do not have the same density, uniformity and resilience for laundering.
- Consider the clinical context when deciding if a medical-grade sheepskin is appropriate. Medical grade sheepskins require specialist laundering. This means they might not be practical in clinical situations where frequent laundering is expected (e.g., for incontinent individuals or for individuals with heavily exuding wounds).[37]
- Consider the potential negative impact of a medical grade sheepskin on the function of the full body support surface. A sheepskin could create surface tension (sometimes referred to as hammocking) that decreases the envelopment, immersion and microclimate management properties of the support surface.
- Regularly assess the individual to evaluate the choice to use a medical grade sheepskin. Medical grade sheepskins are reported to be particularly warm.[37,39] This might reduce acceptability for some individuals. It also might change the microclimate in such a way as to increase the risk of PIs (e.g., increased temperature and moisture).

- Medical grade sheepskins are a single patient/individual use only device.
- Be aware that medical grade sheepskins are an animal-based product and may not be acceptable to all individuals.
- Review the guideline section on *Preventing Heel Pressure Injuries* before considering the use of a medical grade sheepskin as a support surface under the heels.

Additional considerations for neonates and children

- In general, medical grade sheepskins are not appropriate for use with neonates and young children. A medical grade sheepskin support surface requires specialist laundering and is not appropriate for children requiring continence management. A medical grade sheepskin can increase heat and warmth and is not consistent with safe sleeping guidelines.

Clinical question: Should fiber surfaces versus pressure redistribution foam (reactive) full body surfaces be used to prevent PI occurrence for individuals at risk?

SS9: We suggest a fiber support surface is not used to prevent pressure injuries in individuals at risk in settings where a pressure redistribution foam (reactive) full body support surface is available.

(Conditional recommendation, very low certainty of evidence)

Evidence summary

The meta-analysis[40] included one RCT[22] that compared a fiber pad/surface to a pressure redistribution foam pad/surface. The meta-analysis showed that fiber surfaces were associated with a non-significant lower rate of PI occurrence (RR 0.86, 95% CI 0.18 to 0.96, p = 0.62) that translated to 58 fewer individuals per 1,000 experiencing a PI with a fiber support surface (from 218 fewer to 235 more individuals 1,000 individuals).[40] However, the evidence is very uncertain and was downgraded for the risk of bias and imprecision. The evidence is also from the 1980s and may not reflect ant currently available fiber support surfaces. No evidence was available on resources and cost effectiveness. Based on the very low certainty of evidence and the low acceptability and feasibility, the Guideline Governance group suggests not to use fiber support surfaces when there is an option to use a pressure redistribution foam (reactive) support surface. **If there are no other options, a fiber support surface does provide pressure redistribution.**

Clinical question: Should air fluidized full body support surfaces versus any other support surfaces be used to prevent pressure injuries for individuals at risk?

SS10: We suggest an air fluidized full body support surface is not routinely used to prevent pressure injuries in individuals at risk.

(Conditional recommendation, very low certainty of evidence)

Clarifiers:

- **An air fluidized full body support surface might be considered for individuals at very high pressure injury risk (e.g., those who are immobilized with extensive burns) or who have previously experienced a full thickness pressure injury on a different full body support surface.**
- **Air fluidized full body support surfaces might be used for individuals with existing full thickness pressure injuries or following surgical reconstruction with flaps/grafts.**

Evidence summary

A meta-analysis of two RCTs[16,41] showed that air fluidized full body support surfaces are associated with a non-significant lower rate of PI occurrence compared to pressure redistribution foam (reactive) and alternating pressure air (active) full body support surfaces (RR 0.66; 95% CI 0.34 to 1.28, p = 0.22). This translated to 96 fewer individuals per 1,000 (from 187 fewer to 79 more) experiencing a PI when using an air fluidized full body support surface. However, the evidence was of very low certainty and was downgraded for the risk of bias, indirectness and imprecision. The desirable effects were considered small due to the wide confidence interval, and were heavily outweighed by relatively large costs, resource requirements (e.g., reliable electrical supply), feasibility (space and architectural support for a large heavy bed, carer burden), and undesirable effects (drying/dehydration, difficulties with self or assisted repositioning on the surface, disorientation). Although newer designs of air fluidized surfaces may have fewer disadvantages, the costs generally outweigh benefits when other appropriate full body support surfaces are available. As noted in the clarifiers, there are clinical situations in which an air fluidized bed might be appropriate for an individual at risk of PIs, including those who are highly immobile and critically ill, those who have previously experienced a PI on a pressure redistribution full body support surface, and to prevent new PIs following surgical reconstruction of a previous PI.

Clinical question: Should a low air loss (reactive) full body support surface versus any other support surface be used to prevent pressure injuries for individuals at risk?

In this Guideline, a low air loss (reactive) support surface refers to a support surface construction that uses a flow of air to assist in pressure redistribution. Low air loss (reactive) support surfaces may also assist in managing heat and humidity (microclimate) of the skin.

SS11: We suggest a low air loss (reactive) full body support surface could be used for individuals at risk of pressure injuries, especially when moisture and heat at the skin-surface interface are contributing factors.

(Conditional recommendation, very low certainty of evidence)

Evidence summary

A meta-analysis of three RCTs[23,42,43] exploring low air loss (reactive) full body support surfaces was conducted. For the purposes of this analysis, low air loss (reactive) full body support surfaces were considered as distinct and separate from other reactive air constructions. The analysis showed that low air loss (reactive) full body support surfaces are associated with a non-significant lower rate of PI occurrence (RR 0.76, 95% CI 0.06 to 9.13, p = 0.83). This translated to 30 individuals fewer per 1,000 who might experience a PI if a flow air loss (reactive) full body support surface is selected (from 118 fewer to 1,000 more). However, the certainty of evidence is very low, and the evidence was downgraded for the risk of bias, inconsistency and imprecision. The comparator support surfaces in the studies[23,42,43] were an alternating pressure (active) air mattress, a medium density polyurethane pressure redistribution foam (reactive) mattress and a “standard” (vinyl) hospital mattress. No serious adverse events were reported in any of the studies. Due to the moderate resource requirements, low air loss (reactive) full body support surfaces may be more appropriate for individuals at very high risk of PIs and may be indicated for moisture management in individuals with exposure to excess moisture. Access to low air loss (reactive) full body support surfaces is limited in many geographic and clinical settings.

Implementation considerations

- Assess and maintain skin moisture and overall hydration to reduce the known drying effects of a support surface with enhanced microclimate management properties (e.g., a low air loss surface).
- Evaluate the individual's ability to move in and egress from a low air loss bed. If self-repositioning and mobilization is difficult, consider using a different full body support surface as so as mobility is becoming re-established.
- A full body support surface with micromanagement properties is not required to manage increased moisture associated with heavily exuding wounds or incontinence.

Support Surfaces in Specific Clinical Settings

Clinical question: What are the general considerations with respect to support surfaces for transit of an individual at risk of pressure injuries?

SS12: It is good practice to use a full body support surface with pressure redistribution features for medical procedures and for an individual at risk of pressure injuries in transit.

(Good practice statement)

Supporting information

Individuals are at risk of PIs when they are in contact with any support surface and have a degree of immobility or inactivity. This includes vehicle transportation, while waiting for a clinical review and/or admission in the emergency department, and while undergoing medical assessments and procedures.[44] Undertaking a comprehensive PI risk assessment during transit is often not possible, particularly in the emergency vehicle when the care team has competing priorities (e.g., respiratory and cardiac stabilization). Using a full body support surface as soon as possible in the care journey for individuals at PI risk is good practice.

Clinical question: What are the general considerations with respect to support surfaces for transit of an individual with suspected spinal cord injury?

SS13: It is good practice to transfer the individual off a spinal hard board/backboard as soon as medically feasible after admission, in consultation with a qualified health professional.

(Good practice statement)

Supporting information

Individuals with suspected spinal cord injury (SCI) are often managed prior to hospitalization with an extrication collar and long spine board or spinal backboard to restrict spinal motion. Restriction of spinal motion (particularly on a long spine board) is associated with increased adverse events, including pressure injuries.[45] Transferring the individual from a long spine board/backboard to a pressure redistribution support surface as soon as clinically feasible is good practice.

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