PREVENTIVE SKIN CARE

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Introduction

Promoting skin health is fundamental to preventing and treating skin conditions and promoting the comfort and self-esteem of individuals. Promoting skin integrity is the goal of preventive pressure injury (PI) care. Strategies that are used to promote skin health include:

- structured skin care regimens,
- promoting optimal nutrition, hydration, and mobilization, and
- appropriate treatment and prevention of other skin conditions (examples include but are not limited to intertriginous dermatitis and incontinence-associated dermatitis).

Regular skin care also provide an opportunity to conduct a skin and tissue assessment and to identify areas at risk that may require targeted interventions and/or changes to the individual's overall PI prevention plan. The recommendations and good practice statements presented below focus on direct care of the skin to reduce the risk of PIs and are generally relevant to all individuals at risk of PIs, except where specified.

Topical Skin Care

Clinical question: What are the general considerations when developing a skin care regimen for individuals at risk of a PI?

SK1: It is good practice to evaluate the skin regularly and to implement a structured skin care regimen.

(Good practice statement)

Supporting information

Targeted skin care maintains or enhances skin integrity. Structured skin care regimens include gentle skin cleansing and drying and, when indicated, application of products to hydrate/moisturize the skin, protect the skin from moisture and/or to relieve signs and symptoms such as skin dryness (i.e., skin characterized by dull appearance, presence of dry desquamation or scales, and/or pruritus). Skin care regimens may increase skin tolerance to mechanical stress by supporting skin resilience and reducing risks such as maceration and inflammation.[1]

Implementation considerations

Assessment

- Assess the skin regularly from head to toe,[2] including every time skin care is delivered[3] and when the individual is repositioned.
- Monitor and document any skin lesions using accurate terminology and anatomical locations to enhance interprofessional communication and diagnostic decision making.[4]
- A full skin assessment should include skin and tissue on the scalp and under hair. Attend to hair regularly to inspect and maintain the scalp. Consider using wide-toothed combs and moisturizing/lubricating hair products for individuals with curly, textured or tightly coiled hair[5] to facilitate visual inspection around and underneath hair.

Cleansing and drying

- Develop an individualized skin care regimen. Daily routine washing of the whole body may not be necessary. Frequent cleansing may cause the skin to become excessively dry. Determine the frequency of skin cleansing with consideration to:
  - The findings from regular skin assessments (including changes since the last assessment),
  - Soiling or moisture from incontinence, perspiration, secretions or other sources,
  - Factors that impact skin integrity, including but not limited to co-morbidities, medications, age and the climatic local environment,
  - Cultural or habitual practices, and
  - Preferences of the individual.
- Use only light pressure when washing and drying the skin.[3,6]

Moisture balance

- Reduce the skin's exposure to water and consider applying lipophilic leave-on skin care products if the skin is excessively dry.

Skin care product selection

- Select cleansing and topical leave-on products with a slightly acidic (4.5-5.5) pH[3,6,7] (i.e., balanced to the normal pH of the skin[2,7]).
- Apply products according to the manufacturer's instructions.
- Assess possible adverse events (e.g., contact irritant dermatitis) arising from skin care product use.

Other considerations

- Consider using a mattress with microclimate management properties such as a low air loss (reactive) full body support surface for individuals at risk of excess general body moisture (e.g., from perspiration). See the guideline section *Full Body Support Surfaces, Recommendation SS11*.
- Remove hair braids, hair accessories and extensions to reduce the risk of these causing occipital PIs.[8-10] Where removal is not possible due to cultural norms or preferences of the individual, consider using a fluidized positioner to offload the area.[9]

<u>Additional considerations for individuals with incontinence</u>

- Assess skin exposed to urine or stool for signs of incontinence-associated dermatitis.
- Work with the individual and multidisciplinary care team to eliminate or minimize exposure of the skin to urine and/or stool using strategies consistent with the individual's goals of care.
- Use a suitable continence product. An independent, evidence-based, not-for-profit decision support system is the Continence Product Advisor.
- Avoid occlusion of the skin with impermeable waterproof continence products.[11]
- Change absorbent products as soon as possible after incontinence episodes.[2]

Additional considerations for individuals with dark skin tones

- Ensure the skin is appropriately hydrated and not overly dry or moist. Dark toned skin may become excessively dry and may require more moisturization.

Preventive Dressings

Preventive dressings are dressings that are designed for application to intact skin. Preventive dressings are used to reduce sustained exposure of the skin and soft tissue to mechanical forces that cause deformation of cells, leading to their breakdown.[12] Different wound dressings (e.g., film dressings) have been explored for use as a preventive intervention; but most recently the research has focused on multilayered soft silicone foam dressings.

Clinical question: Should any preventive dressing versus a leave-on topical skin product be used to prevent PI occurrence in individuals at risk?

Clinical question: Should a multilayered soft silicone foam dressing versus no preventive dressing be used to prevent PI occurrence in individuals at risk?

SK2: We suggest using a multilayered soft silicone foam dressing on sacrum and heels for individuals assessed as having a high risk of pressure injuries, where resources permit.

(Conditional recommendation, very low certainty of evidence)

Note: Using a preventive dressing on the heels is discussed in more detail in the guideline section Heel Pressure Injuries. Use of a preventive dressing to prevent PIs associated with devices is discussed in the guideline section Preventing Device Related Injuries.

Evidence summary

In the first analysis, we considered studies that compared any preventive dressing to any leave-on topical skin product used for the purpose of preventing PIs. Only one relevant randomized controlled trial (RCT) was identified.[13] In this study, a preventive dressing (a multilayered soft silicone foam dressing) was compared to using a leave-on topical product (a product that contained a fatty acid) for participants in an inpatient tertiary setting who were assessed as being at high risk of PI. The meta-analysis showed that using a preventive dressing for 14 days is associated with a statistically non-significant lower rate of PIs (relative risk [RR] 0.78, 95% confidence interval [CI] 0.23 to 2.68, p = 0.70), translating to a difference of 13 fewer per 1,000 individuals experiencing a PI when a preventive dressing is used. However, the result is very uncertain; the true effect lies between 46 fewer and 100 more individuals experiencing a PI with a preventive dressing. The GGG decided that there was insufficient evidence to recommend a leave-on topical skin product instead of a preventive dressing (see Recommendation SK4).

In the second analysis, we considered studies that used any preventive dressing described as being a multilayered soft silicone foam preventive dressing. Studies were eligible for inclusion regardless of the anatomical location on which the preventive dressing was applied. The guideline section *Heel Pressure Injuries* specifically addresses application of a preventive dressing to the heels. Studies in which the dressing was applied underneath a device were not considered in this analysis due to the potentially different conditions. The guideline section *Preventing Device Related Pressure Injuries* addresses use of preventive dressings underneath/around devices.

A meta-analysis of 18 RCTs[13-30] that compared using a multilayered soft silicone foam dressing to not using a preventive dressing showed the intervention was associated with a lower rate of PIs (RR 0.46, 95% CI 0.32 to 0.65, p < 0.0001). This translated to a difference of 53 fewer per 1,000 individuals experiencing

a PI when a preventive dressing is used. However, the result was very uncertain; the true effect lies between 66 fewer individuals and 34 fewer individuals experiencing a PI with a multilayered soft silicone foam dressing. The studies were conducted in intensive care units (ICUs), medical and surgical wards, emergency departments and aged/long term care. In most studies the multilayered soft silicone foam dressing was inspected daily and changed when soiled or dislodged,[14-19,22-26,30] and replaced every three days,[14-20,23,26,30] four days[30] or weekly.[14,18] The studies were conducted over durations of four days to six weeks. About half of the studies used the preventive dressing for two weeks or shorter. The evidence was primarily surrounding the use of preventive dressings for the heel and the sacrum rather than other anatomical locations.

The reported undesirable effects were generally of a non-serious nature (e.g., skin itching, burning pain and warm sensation under the preventive dressing) and at low rates.[15,19,22] The rate of undesirable effects was 3% (33/1087) in the largest study.[15] Several studies reported that no adverse events occurred.[18,24,25] The Expert and Consumer Panel Groups provided the opinion that access to preventive dressings is limited outside of a tertiary care setting in most geographic locations, and suggested that there might be inequity if a preventive dressing is recommended for preventing PIs. The Guideline Governance Group concluded that using a preventive dressing was probably acceptable and feasible for individuals at risk of PIs, but this was variable depending on the clinical setting. Several cost analyses showed that a preventive dressing can be associated with economic savings,[31,32] but the Guideline Governance Group was of the opinion that cost-effectiveness is likely to vary substantially based on the clinical setting and the individual's PI risk profile.

Implementation considerations

- Implement other PI prevention measures (e.g., repositioning of the individual and support surfaces) in conjunction with using a multilayered soft silicone foam dressing.[33]
- Assess the skin under a multilayered soft silicone foam dressing at least daily to evaluate the effectiveness of the preventive PI care plan. Multilayered soft silicone foam dressings have features that facilitate regular skin assessment (e.g., silicone interface[24,34] and non-adhesive edges[35,36]).
- When selecting a multilayered soft silicone foam dressing consider:
  - PI risk profile of the individual.
  - Potential benefit of using a multilayered soft silicone foam dressing
  - Potential influence of the dressing on moisture and temperature at the skin surface[37-39]
  - Size and design of the multilayered soft silicone foam dressing
  - Ability to maintain the multilayered soft silicone foam dressing in situ
  - The individual's preferences, comfort and any allergies
  - Coefficient of friction at the skin-dressing interface
  - Cost-effectiveness and accessibility.
- Avoid stacking multiple dressings under a device.
- Monitor for potential adverse effects (e.g., local skin irritation).
- Replace a multilayered soft silicone foam dressing if it becomes dislodged, loosened or excessively moist, if the dressing or skin underneath the dressing becomes soiled,[15-19,22-26,30,34] and according to the manufacturer's instructions.
- Take care to avoid skin tears or epidermal damage when removing the preventive dressing.
- Customize protocols specific to your setting and population to guide the selection of individuals for whom use of a multilayered soft silicone foam dressing could be considered and (e.g., based on risk factors, especially immobility, abnormal activity patterns and exposure to friction and shear).
- Customize local protocols for use of preventive dressings, together with other preventive strategies for specific anatomical locations.
- Customize protocols specific to your health service, setting and population to facilitate implementing a multilayered soft silicone foam dressing as early as feasible in the care pathway (e.g., applied in the

ambulance, emergency room or operating room with consideration to manufacturer instructions) for appropriate individuals.[24]

Additional considerations for individuals who have incontinence

- Carefully weigh the benefits, risk and cost-effectiveness of using a preventive dressing for individuals who have incontinence, particularly if the individual is experiencing frequent loose stool.
- When using a preventive dressing in the context of incontinence, there is a higher risk of soiling the dressing, skin irritation and moisture-associated skin damage. More regular skin and tissue assessment is required.
- Replace preventive dressings as soon as possible following episodes of incontinence if the preventive dressing is soiled.

Additional considerations for individuals with dark skin tones

- Integration of preventive dressings early in the care pathway might reduce the disparities observed in PI occurrence and severity of PIs in individuals with dark skin tones in whom early identification of skin and tissue changes can be more difficult.[15] However, continued regular inspection of the skin underneath the dressing is still required.

Additional considerations for individuals living in community settings

- Educate individuals using preventive dressings in community settings that skin assessment must be conducted regularly and that this requires the preventive dressing to be lifted and then resecured for an assessment of the skin underneath.
- Carefully evaluate the cost-effectiveness of long-term use of a preventive dressing. Individuals living independently in the community often have long term PI risk and ongoing use of a preventive dressing may be cost prohibitive.

Additional considerations for individuals with spinal cord injury or sensory impairments

- Use preventive dressings cautiously in individuals with neurological impairment. There is a risk that preventive dressings can become dislodged and/or the edges can roll. Individuals with neurological impairment that reduces their sensory function are less able to identify if the dressing edges have rolled. If using a preventive dressing, individuals with SCI should check the integrity of the preventive dressing regularly, including after every transfer.

Low Friction Fabrics

Textiles with low coefficient of friction have been explored as a strategy to reduce the impact of shear forces on the skin and tissues. Low friction fabrics are designed with properties that decrease friction between the individual and the support surface, for example through promoting more rapid absorption and evaporation of moisture (e.g., from perspiration or secretions) than traditional cotton fabrics.[40,41] These textiles are described in the literature as silk-like 'linen', specialty 'linen' or low friction fabric, and are used for bedding (e.g., sheets and draw sheets) and wearable items such as gowns and bootees.

Clinical question: Should a low friction fabric product versus no low friction fabric be used to prevent PI occurrence in individuals at risk?

SK3: We suggest considering the use of low friction fabrics for individuals at risk of pressure injuries who are unable to reposition independently.

(Conditional recommendation, very low certainty of evidence)

Clarifiers:

- **Assess the individual's activity and mobility levels regularly and evaluate the safety of low friction fabrics as their degree or level of activity and mobility increases.**

Evidence summary

A meta-analysis of one RCT[42] and six non-randomized comparative studies[40,41,43-45] showed that using low friction fabric was associated with a lower rate of PIs (5.1% versus 10.8%, RR 0.33, 95% CI 0.17 to 0.62, $p < 0.001$) compared with cotton blend fabric. This translated to a difference of 73 fewer per 1,000 individuals experiencing a PI when low friction fabrics were used. However, this result is very uncertain; the true effect lies between 90 fewer individuals and 41 fewer individuals experiencing a PI with low friction fabric interventions. Most of the studies used a full bed sheet set (i.e. top and bottom sheets, pillow cases and a draw sheet) and patient gowns,[40,41,43-45] and one study focussed on low friction fabric bootees to prevent heel PIs.[42] The studies were conducted in care homes,[41] medical units,[40,42,43,45] orthopedic wards[45] and intensive care settings[40,43,44] for between five days and six weeks (most studies for a maximum of two weeks).

None of the included studies explored or reported undesirable effects. In one of the studies,[42] individuals were withdrawn from the study if their risk of falls increased during the study period, because the researchers determined that wearing low friction bootees might further increase the risk of falls. There were no studies reporting resource requirements, but it was concluded by the Guideline Governance Group that these would likely vary depending on clinical and geographic location and other factors (e.g., the size of a health facility). A cost analysis[46] suggested that the savings associated with preventing PI outweighed the cost of implementing low friction fabrics (cost saving of more than £63,000 per 100 at-risk individuals calculated in the UK in 2010).[45] However, the data represented only one region in the UK and the analysis was at high risk of bias.[46] The Guideline Governance Group concluded that using low friction fabrics for individuals at risk of PIs had variable acceptability and feasibility, and recommending the intervention was likely to increase inequity due to variable access.

Implementation considerations

- Evaluate the risk of falls associated with low friction fabric bootees in ambulatory individuals.
- Evaluate the impact of low friction fabrics on bed mobility, particularly when the individual's activity increases.
- Follow manufacturer information on the care and laundering of low friction fabrics and implement any facility-level process changes that may be required (e.g., 'linen' ordering, laundering, etc.).
- Provide education for health professionals, patient consumers and informal carers when introducing low friction fabrics to the inventory.[47]

Clinical question: Should a leave-on topical skin product versus no leave-on topical skin product be used to prevent PI occurrence in individuals at risk?

Commonly used terms to describe leave-on topical products (e.g., cream, emollient, moisturizer, oil, etc.) are varied and may not accurately characterize the product.[2] For example, products described as hyperoxygenated fatty acid-based preparations consist of esters from glycerol and different fatty acids. Although it is present, fatty acid is not the only defining product characteristic. The descriptors 'cream' or 'moisturizer' are unclear characterization of products, because these preparations are mixtures of many ingredients that lead to various product characteristics and functions. Because of the huge number, variety and non-comparability of topical products, the Guideline Governance Group considered the use of any (topical) leave-on product, which includes all different kinds of oils, creams, emulsions etc. used specifically for PI prevention.

SK4: We make no recommendation on the routine use of leave-on topical skin products to prevent pressure injuries.

(Very low certainty of evidence)

Evidence summary

The meta-analysis included nine RCTs[13,14,48-54] that compared a leave-on skin product to using no leave-on skin product to prevent PIs. The meta-analysis showed that using a topical leave-on skin product was associated with a significantly lower rate of PIs (16.7% versus 23.3%, RR 0.52, 95% CI 0.41 to 0.66, p < 0.001), translating to a difference of 112 fewer per 1,000 individuals experiencing a PI when a topical product is used. However, it is very uncertain if the result represents a true effect; the true effect lies between 138 fewer individuals and 79 fewer individuals experienced a PI with a leave-on topical skin product. The studies explored products that contained a range of different ingredients and were primarily plant-based (e.g., aloe vera gel, vegetable or seed oils, etc.).

In a meta-analysis of studies exploring different leave-on topical skin products to placebo topical products for preventing PIs,[55] adverse events occurred at a higher rate with a leave-on topical skin product, but the difference was not statistically significant (0.6% versus 0%, RR 4.38, 95% CI 0.50 to 38.30, p = 0.18), and there was low certainty that this represented a true effect. There is a large body of evidence that is not specific to PI prevention suggesting that vegetable and seed oils should not be used in people with skin barrier impairments, because disruption to the stratum corneum (e.g., from free fatty acids) can lead to skin irritation and other adverse events.[56]

The Guideline Governance Group noted the desirable and undesirable effects, and the very low certainty of the evidence. Due to the lack of evidence that fully elucidated any mechanism by which leave-on topical skin products could influence PI development, the Guideline Governance Group determined that no recommendation could be made about the use of leave-on topical skin products for preventing PIs.

Implementation considerations

- Access other relevant clinical guidelines and/or carefully appraise the evidence for effectiveness if considering the use of leave on skin products for achieving clinical outcomes beyond prevention of PIs (e.g., preventing incontinence-associated dermatitis).
- Consider the individual's psychosocial and cultural health and norms when deciding whether to use leave on skin products.
- Avoid massaging/rubbing the skin vigorously if a choice is made to apply leave on skin products.

Future Research

The evidence available to address all the clinical questions on preventive skin care was generally of low or very low certainty. This was primarily because the studies were at high risk of bias due to challenges designing blinded studies without confounding factors and with sufficiently large populations. The Guideline Governance Group noted the following gaps in the evidence addressing the topics in this section that require future research:

- There is only limited evidence[57,58] on the effectiveness of preventive dressings used at anatomical locations other than the heel or the sacrum. Further research on use of preventive dressings to protect pressure points in prone position and other bony prominences (e.g., elbows) is warranted.
- There is limited evidence on the effectiveness of preventive dressings in some specific population groups (including but not limited to individuals at the end of life, individuals with spinal cord injury and

individuals with dark skin tones). Exploration of the role preventive dressings can play in the care trajectory of these individuals would be beneficial.

- There is limited evidence on the effectiveness and cost-effectiveness of preventive dressings used over time, including clinical studies that extend on the current bench science[12,59,60] by exploring the duration of time/clinical conditions requiring replacement of a preventive dressing or the incorporation of preventive dressings into PI prevention plans over longer durations (e.g., more than six to eight weeks).
- There is limited recent evidence on the effectiveness of low friction fabrics, including their use in conjunction with topical skin products (e.g., moisturizers) and preventive dressings. More exploration of the potential benefits and risks and the incorporation of low friction fabrics into care pathways is required.
- There is an overall paucity of research that is co-designed with consumers or that focusses on patient reported outcome measures (PROMs, e.g., comfort, etc.) associated with different preventive skin care interventions.
- There is a paucity of evidence on effectiveness of different preventive skin care interventions for neonates and children.
- There is limited evidence on the effectiveness of leave-on topical products based on prespecified mechanisms of action regarding prevention of PIs. Explanative proof-of-concept studies are warranted.

The Guideline Governance Group noted there was no comparative evidence to address the following clinical questions:

- The effectiveness of a hydrocolloid dressing used for preventing PIs (not device-related) versus no preventive dressing.
- The effectiveness of a multilayered soft silicone foam dressing versus any other preventive dressing for anatomical locations other than the heel and sacrum.

The Guideline Governance Group noted difficulties in evaluating the evidence related to leave-on topical skin products. There are wide discrepancies in the ways products are described and classified, and there is no strong evidence on the mechanism by which a leave-on topical skin product prevents PIs. Future research is required to attain clarity regarding the mechanisms by which oil-based products prevent PI. A transparent product classification system is also needed, as well as well-conducted clinical studies using clinically relevant head-to-head comparisons of major and widespread topical products.

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