### Location

#### Sacrum & Buttocks

**Mechanism of Injury**

- Pressure, Friction, Shear & Microclimate

Elevating the head of the bed increases pressure and shear on the pelvic region. Note the percent of body mass that is focused on the pelvic region as the head of bed is raised.

- 0° = 33% of body mass
- 30° = 44% of body mass
- 45° = 52% of body mass
- 90° = 70% of body mass

Additional loading of the pelvic region occurs when the head of the bed is raised without a profiling bed frame, which accommodates the pelvis as the head of the bed is raised, preventing the "closing vise" effect.

Moisture extremes increase risk, moisture increases friction and thus shear; dryness stiffens the skin and decreases tolerance for pressure and shear.

#### Mechanisms of Protection

- The dressings used for pressure ulcer prevention should:
  1. Redistribute pressure
  2. Minimise shear
  3. Balance micro-climate
  4. Reduce friction
  5. Prevent mechanical stripping of skin when removing the dressing to inspect the skin
  6. Provide barrier protection to the skin
  7. Have an atraumatic contact layer

#### Dressing Selection

**Structure:**

- A multi-layer silicone foam dressing with the ability to redistribute pressure and absorb shear, and effectively manage microclimate.
  1. Skin contact layer: adhesive, elastic/flexible soft silicone or silicone like adhesive in total contact with the skin under the entire dressing that allows reapplication of the dressing for skin inspection
  2. Moisture absorption characteristics: spread, lock, evaporate
  3. Thickness: allows redistribution of pressure
  4. Several sliding layers: ability to move independently of each other which dissipates shear
  5. Outer breathable layer: minimises friction between the dressing and the bed linen (lower coefficient of friction)

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#### Heel

**Mechanism of Injury**

- Sustained pressure due to the prominence and shape of the calcaneus. Heels in contact with the bed, footstool, cast or splint.

Increased shear and friction seen in: uncontrolled leg movement, repetitive use of the heel to move in the bed.

The above are compounded by reduced vascular supply and/or impaired neurological status.

**Mechanisms of Protection**

The dressing should have the same properties as above for the sacral region with additional focus on:

1. Redistributing pressure across the entire heel region including lateral angle of the calcaneus

**Dressing Selection**

**Structure:**

- The dressing should have the same structural properties as above for the sacral region with the additional focus on:
  1. The ability to conform and adhere to the shape of the heel
  2. Ability to minimise displacement due to frequent movement of the leg
  3. Ability to ambulate with the dressing intact
  4. Ability to provide columnar support
Consensus group

The formulation of consensus based recommendations upon the use of wound dressings in pressure ulcer prevention was undertaken by a consensus group bringing together experts in pressure ulcer prevention and treatment from Australia, Portugal, the United Kingdom and the United States.

Having explored the evidence both clinically and in the laboratory that wound dressings may play a positive role in pressure ulcer prevention, and then having defined research questions that would help develop a classification of the likely effectiveness of dressings when used in pressure ulcer prevention, the consensus group (see below) then considered what recommendations could be offered at this time to help practitioners employ wound dressings most effectively as part of pressure ulcer preventive care.

Areas at risk of developing pressure ulcers

- The sacrum is reported as the most common location for pressure ulcers in most care settings.
- Recent trend data suggests that the incidence of heel ulcers is rising. The heel is typically reported to be the second most common location for pressure ulcers.
- Medical device related pressure ulcers are a growing concern.
- Pressure ulcers are also found in atypical locations such as when a patient is nursed in the prone position.

Remember that pressure ulcers may occur at any body site where skin and soft tissue loading is prolonged or excessively high.
How dressings prevent pressure ulcers

Shear redistribution

The dressing translates shear force to the skin outside the area of concern. Within the dressing the interface of multiple layers aids in the absorption of shear. The elastic nature of the silicone adhesive also absorbs shear. Buckling at the edge of the adhesive border of the dressing also absorbs shear. Dressings of a thickness between 3.5 and 4.5mm or thicker are most desirable (Thickness is measured under a 0.1 Newton load to ensure reliable measurement).

Pressure redistribution

The presence of a dressing with adequate thickness distributes forces over a larger area thus accomplishing pressure re-distribution by reducing the percentage of magnitude of forces applied to the skin.

Friction reduction

The texture and material of construction of the outer layer of the dressing can increase or reduce friction. If the surface of the dressing is slippery it will reduce friction, conversely if it is not it will increase friction. Reducing friction is important because friction is the source of shear. Friction is always the result of two surfaces moving relative to each other.

Balance of microclimate

Use a dressing that maintains relative humidity of between 40 and 80% at the skin surface to maximise the resilience of the skin. Dressings that trap moisture at the skin surface reduce the strength of the skin and lead to maceration. Dressings that withdraw too much moisture can predispose skin to stiffness and cracking. This can be identified by obvious signs of maceration or dryness.
1. Consider the use of a multi-layer silicone foam dressing to enhance, but not replace, pressure ulcer prevention strategies for the sacrum, buttocks and heel. (SOE=B)

Recent studies have indicated that multi-layer soft silicone foam dressings applied to the sacral region help reduce pressure ulcer incidence. Use of these dressings in addition to an appropriate pressure redistributing support surface may assist pressure ulcer prevention where patients are unable to be repositioned or are likely to undergo lengthy surgical procedures.

The use of multi-layer soft silicone foam dressings may also impact on the local microclimate between the skin, bed linens and the support surface. Excessive moisture on the skin leads to maceration and loss of the ability of the dry epidermis to glide on bed linens. Patients are often stressed during acute illness and sweating is a natural response to the stress. When the sweat is trapped against the skin, the skin’s microclimate and physical properties change, i.e. elasticity, stiffness and strength, and these changes are made worse if the sweat cannot evaporate. The multilayer silicone foam dressing’s ability to absorb moisture from the skin and transmit it to the exterior was tested in the laboratory. Both the wicking and moisture transmission were found to be superior to other dressings.

It is essential to continue to provide routine pressure ulcer preventive care based on the level of risk for pressure ulcers, including skin assessment beneath the dressings, pressure redistribution through turning and repositioning, adequate nutrition and appropriate support surfaces.

All dressings are not equivalent and the recommendations in this document are based on the available evidence on the performance, structure and function of dressings. For specific information on dressing selection for sacrum, buttocks and heel see Table 1.

2. Before selecting a dressing consider the current status of the skin and the ease of dressing removal in order to prevent mechanical stripping. (SOE=B)

Skin injury can result from repeated removal of strongly adhesive dressings. If skin is torn, easily bruised or fragile use a dressing such as soft silicone which is recognised to prevent skin damage. Consider the use of retention bandages carefully as incorrect application could lead to increased pressure upon the bony prominence.

3. Apply the dressing to dry intact skin. Do not use emollients or other barriers (SOE=C)

Emollients and other skin preparations and barriers can reduce the adhesive properties of the dressing.

4. Choose a dressing[s] that exceeds the area of tissue at risk on the sacrum, buttocks or heel to be protected from pressure and shear. (SOE=C)

Size the dressing to allow the pressure and shear forces to be deflected into tissue outside the area of risk. The use of multiple dressings of the same type may be required to achieve this objective.

5. Continue to inspect the skin beneath the dressing on a regular basis in accordance with standards of care and/or institutional policy. (SOE=C)

Dressing selection should encompass the ability of the dressing to be removed to allow skin inspection on a regular basis. This will be dependent on the atraumatic nature of the dressing.

6. Frequency of dressing changes should be in line with institutional policy and manufacturers recommendations or as clinically indicated. (SOE=C)

Dressings that become soiled or damaged may need to be changed more frequently than prescribed by institutional policy or manufacturers recommendations.

7. Consider discontinuation of the dressing as the patients risk for pressure ulcer development decreases as per clinical assessment. (SOE=C)

Assess the continued usefulness of the dressing as an on-going prevention strategy when undertaking the regular review of patient pressure ulcer risk status and prevention strategies. As the level of risk reduces, the dressing may no longer be required.

Protecting the sacrum and buttocks

8. Consider placement of multi-layer soft silicone foam dressings to the buttocks and sacrum prior to prolonged procedures or anticipated events when the patient cannot move or be moved from the supine position. (SOE=B)

Recent studies have indicated that multi-layer soft silicone foam dressings applied to the sacral region help reduce pressure ulcer incidence. Use of these dressings in addition to an appropriate pressure redistributing support surface may assist pressure ulcer prevention where patients are unable to be repositioned or are likely to undergo lengthy surgical procedures.

9. Consider placement of soft silicone dressings to the buttocks and sacrum when the head of the bed must be continuously elevated. (SOE=B)

Recent studies have indicated that multi layer soft silicone foam dressings applied to the sacral region help reduce pressure ulcer incidence. When the head of bed is elevated, the pelvic region supports greater body mass therefore risking a potential increase in pressure and shear at the skin and soft tissues over the sacrum and buttocks.

Protecting the heels

10. Consider placement of multi-layer soft silicone foam dressings to the heels prior to prolonged procedures or anticipated events when the patient cannot move or be moved from the supine position. (SOE=C)

The anatomy and physiology of the heel make the tissue very vulnerable to pressure. When pressure is increased in high risk patients such as those with peripheral arterial disease and neuropathy, the risk of ulceration and failure to heal is greatly increased. Patients at risk of increased pressure on the heel are those who cannot move their legs, such as patients who are anaesthetised, paralysed, or have undergone orthopaedic injury or surgery. These patients require additional precautions to prevent heel ulceration.

11. Consider placement of multi-layer soft silicone foam dressings to the heels for patients at risk of shear injury. (SOE=C)

The anatomy and physiology of the heel make the tissue very vulnerable to friction and shear. While pressure causes compression of the tissues, shear forces occur between the layers of the tissues, and tend to tear and separate them. In some cases, this results in blister formation and breakdown of the fibres that tether the layers of fat and collagen together.

12. Select a multi-layer silicone foam dressing that has been designed to conform to the heel or modify the dressing to fit the heel in accordance with the manufacturers’ recommendations. (SOE=C)

Dependent upon the position of the lower extremity, both the posterior and lateral aspects of the calcaneus are at risk for injury. The multilayer silicone foam dressing must wrap around the calcaneus to provide posterior and bilateral protection, but not prevent the application of appropriate footwear or ambulation. The anatomy, perfusion, shape and angle of the calcaneus all play a pivotal role in the development of pressure ulcers and may vary between patients.

Other pressure areas that need protection:

Although evidence is limited for the other anatomical sites where pressure ulcers occur, for example the ischial tuberosities, greater trochanters, malleoli, occiput and olecranon (elbows), there could be potential benefit for the use of dressings to prevent pressure ulcers at these sites. Further evidence is required.

Use of dressings under medical devices

13. Inspect the skin beneath medical devices according to institutional policy or standards of care. (SOE=C)

There is increasing evidence of pressure damage beneath medical devices.

14. Consider the use of dressings that demonstrate pressure redistribution for body areas in contact with medical devices. (SOE=A)

Redistribution of pressure will reduce the impact on affected body areas.

15. In addition to dressings applied beneath medical devices, continue to lift and/or move the medical device to examine the skin beneath it and reposition for pressure relief. (SOE=A)

The use of a dressing is not a replacement for other prevention strategies.

16. When simple repositioning does not relieve pressure, it is important not to create more pressure by placing dressings beneath tight devices. (SOE=C)

The use of a dressing may increase the pressure upon the skin if it is inappropriately placed under a medical device that presses upon the skin and soft tissues and cannot be repositioned.