

In this article...

- Different types of support surfaces and their effect on skin integrity
- The mechanism of action, benefits and associated risks
- How to select the appropriate equipment to meet individual patients' needs

Pressure ulcer education 4: selection and use of support surfaces



Key points

Support surfaces are a key intervention in pressure ulcer prevention and management

The main use of support surfaces is to redistribute or relieve pressure

There is a shortage of evidence to guide equipment choice

Equipment selection involves assessing patients' risk of developing a pressure ulcer

Health professionals need to take into account patient preferences and where equipment will be used

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Abstract The use of support surfaces is one of the most common interventions for preventing pressure ulcers. These support surfaces can include mattresses, chairs, cushions, foot/heel protection and offloading (removing pressure from the affected area) devices. Nurses need to understand their impact on skin integrity, associated risk factors and how to select the correct equipment for a patient's needs. This article, the fourth in an eight-part series on the development of a core education curriculum for pressure ulcer prevention and management, discusses surface selection and use.

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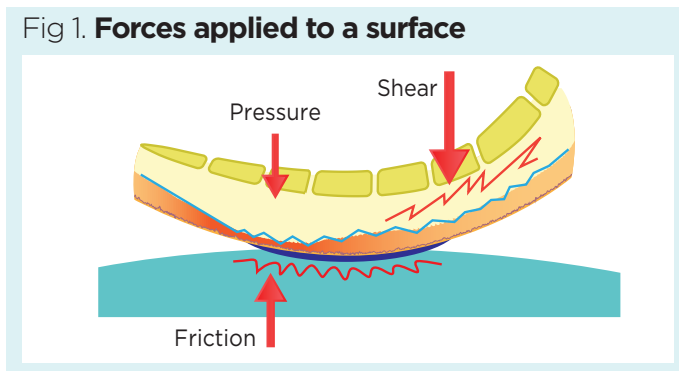
If the body is not adequately supported when lying or sitting, pressure to an area can lead to poor blood flow to the tissue, causing tissue damage; this sensation usually triggers the person to move, relieving the pressure. In patients with reduced sensation or independent movement, however, persistent pressure on an area can cause damage to the skin and soft tissue, resulting in a pressure ulcer.

The use of support surfaces for patients considered to be at risk of pressure ulcers is one of the most common preventative interventions. These include mattresses

(and the bed they are on), chairs, cushions, foot/heel protection and offloading (removing pressure from the affected area) devices. The surface selection and use module in aSSKINg – the new education framework from NHS England (Bit.ly/NHSIPUdefinition), described in part 1 of this series (Bit.ly/UlcerEducation1) – examines the impact of support surfaces on skin integrity and identifies equipment and devices appropriate for the skin device interface. It ensures practitioners can:

- Recognise the risk factors associated with different support surfaces;
- Appreciate the range of equipment available, including the mechanism of action, benefits and associated risks;
- Recognise the need to undertake relevant seating and moving, and handling of risk assessments;
- Understand the role of support surfaces and equipment on the patient's level of independence, while managing the risk of pressure ulcer development;
- Refer the patient to appropriate members of the multiprofessional team throughout the patient journey (including discharge planning).

Fig 1. Forces applied to a surface



There is a shortage of robust evidence on which support surfaces are best to use (National Institute for Health and Care Excellence, 2014a). Nurses should follow local guidance, taking individual circumstances into account, such as patient preferences or the environment in which the equipment will be used, as this may influence selection. The following factors should also be considered:

- Patient's level of mobility and activity;
- Specific requirements to manage the microclimate (temperature and humidity between the patient and surface) and controlling shear forces (illustrated in Fig 1);
- Patient's weight and size;
- Presence of existing pressure ulcers;
- Patient's level of risk for developing new pressure ulcers (determined using a formal risk-assessment tool alongside clinical judgement).

Box 1. Seating: a good fit

- **Seat width** – at least 25mm clearance between patient's hip and side of chair
- **Seat height** – patient should be able to comfortably place their feet on the floor or footplate
- **Seat depth** – at least 25mm between front edge and back of patient's knees
- **Armrest height** – should support the bent elbow
- **Backrest height** – should be high enough to provide support to the back

Source: Stephens and Bartley (2018)

When selecting equipment, nurses should also consider the following:

- It may help to maintain independence;
 - Its impact on manual handling;
 - Whether it increases the risk of falls.
- Patient comfort is crucial. Even when

equipment is assessed as being optimal, if patients do not find the surface comfortable or believe it has a negative impact on their lifestyle, they will often reject it, either overtly or by not using it if health professionals are not around.

It is also important to ensure the manufacturer's instructions for use are followed and equipment is regularly maintained and properly cleaned.

Mattresses

NICE (2014a) suggests patients who are not high risk (determined via risk assessment) may be cared for on a high-specification foam mattress. However, for patients with an existing pressure ulcer, an active support surface is recommended regardless of their risk score, particularly if they:

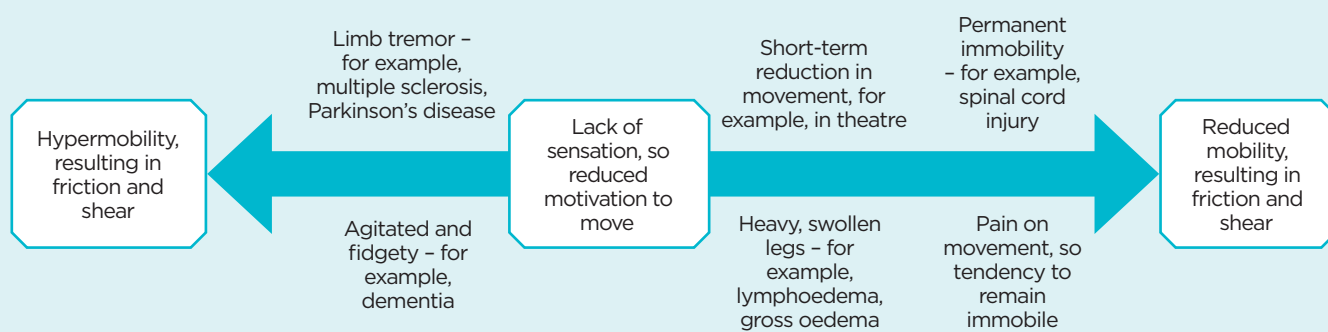
- Cannot be positioned off the ulcer;
- Have pressure ulcers on two or more turning surfaces that limit

Table 1. Devices used to prevent heel damage

Device type	Mechanism of action	Advantages	Disadvantages
Specialised sections of mattress	<ul style="list-style-type: none"> ● Castellated foam – may allow greater immersion and envelopment ● Lowered heel section with calf support may allow offloading/floatation 	<ul style="list-style-type: none"> ● Prevention is in situ, so no additional device is required 	<ul style="list-style-type: none"> ● Only suitable if patient's heels sit within the specific section
Boot	<ul style="list-style-type: none"> ● Physically supports the leg off the bed, providing floatation and open area for the heel 	<ul style="list-style-type: none"> ● Whole-foot protection ● Heel offloading ● Malleolus/Achilles protection ● Only device providing complete offloading ● Some devices allow pedal pulses to be measured 	<ul style="list-style-type: none"> ● Expensive ● Risk of deep vein thrombosis ● Mixed patient concordance (can be too hot) ● Poor visualisation of the heel depending on the material and make-up ● Can reduce mobility and independence ● Increased fall risk ● Cleaning could be a problem ● Bulky ● May result in hyperextension of knee
Pillow	<ul style="list-style-type: none"> ● Physically supports the leg off the bed, providing floatation 	<ul style="list-style-type: none"> ● Widely available ● Usually comfortable ● Inexpensive ● Allows good visibility of the heel ● Allows pedal pulses to be measured 	<ul style="list-style-type: none"> ● Lack of availability (pillows may be required for their original purpose) ● Often poor quality and collapse in use, allowing heel to sit on the bed ● Easy to use incorrectly
Wedge	<ul style="list-style-type: none"> ● Physically supports the leg off the bed, providing floatation 	<ul style="list-style-type: none"> ● Placed across the bed allowing for leg movement without coming off the offloading device ● Allows good visibility of the heel ● Allows pedal pulses to be measured 	<ul style="list-style-type: none"> ● Not always available ● Can be kicked off the bed or moved into an inappropriate placement
Contact cast	<ul style="list-style-type: none"> ● Redistributes the pressure 	<ul style="list-style-type: none"> ● Maximises pressure redistribution 	<ul style="list-style-type: none"> ● Specialist technique not always available
Silicone heel cup	<ul style="list-style-type: none"> ● Redistributes the pressure and mitigates shear 	<ul style="list-style-type: none"> ● Easy to use ● Generally comfortable 	<ul style="list-style-type: none"> ● Frequently lost in the bed linen ● May require additional securement
Low-friction bootie	<ul style="list-style-type: none"> ● Reduces frictional forces so indirectly reduce shear forces 	<ul style="list-style-type: none"> ● Comfortable ● Easy to use 	<ul style="list-style-type: none"> ● Increased risk of falls if left on when mobilising
Multilayer dressing	<ul style="list-style-type: none"> ● Reduce pressure, shear and friction, and manage microclimate 	<ul style="list-style-type: none"> ● Patients frequently unaware of dressing ● Deals with more than one problem: friction, shear, microclimate (and a little pressure redistribution) ● Manages moisture (and may moisturise dry skin) ● Smaller dressings require reduced shelf space and storage ● Multiple use – heel, shoulder, etc ● Continued prevention during patient journey ● Reduced long-term cost ● Stays in situ if applied correctly ● Less heat trapping – reduces temperature ● Easy to apply and to inspect skin 	<ul style="list-style-type: none"> ● May peel off ● Expensive if used for protracted time ● Can be difficult to keep on an agitated patient ● Does not work alone ● Requires time to apply ● Small area of protection ● Many clinicians do not believe evidence in support of their use ● May fall off and increase risk of pressure ulcer

Sources: National Institute for Health and Care Excellence (2019); NICE (2014a; 2014b)

Fig 2. Factors that put heels at increased risk



Source: Black et al (2018)

repositioning options – for example, the sacrum and trochanter (located near the femur);

- Fail to heal or the pressure ulcer deteriorates despite appropriate and comprehensive care;
- Are at high risk of additional ulcers;
- Have undergone flap or graft surgery – loss of perfusion to the area will significantly compromise the flap/graft;
- Are uncomfortable;
- ‘Bottom out’ on the current support surface – the body weight is not adequately supported and the equipment fails to lift the patient clear of the hard surface.

Broadly speaking, equipment works by either redistributing or relieving the pressure. Pressure-relieving surfaces, widely known as alternating mattresses and cushions, alternately apply and remove pressure. They relieve pressure from the area where the cell is deflated and apply high pressure to the area where the cell is inflated. Some patients find this uncomfortable and may complain of seasickness.

Pressure-redistributing surfaces increase the contact area between the body and support surface, and can be made from many materials, including foam, gel, air or combinations of these. They vary considerably in application: a high-specification foam mattress would be used for patients at lower risk, while full low-air-loss or flotation systems are used for those at the highest levels of risk.

Seating

Seating is as important as mattresses. It provides a much smaller surface area to support the patient’s weight, so a patient requiring a pressure-redistributing mattress who spends any time out of bed should be given a specialist cushion.

When selecting a seating solution, it is important to consider both the chair and the

cushion – they may be provided as a single system or separately, but need to work together. Although there has been little new research, seating guidelines have been updated, reflecting a resurgence of interest in the role of seating in the occurrence of pressure ulcers (Stephens and Bartley, 2018).

Providing the correct seating is clinically challenging, as an appropriate seating solution serves multiple functions. Wherever possible, seating should:

- Maintain a functional posture;
- Maintain, promote or improve physiological processes such as breathing;
- Not increase the risk of patient harm, such as pressure ulcers and falls;
- Maintain, promote or improve independence;
- Maintain, promote or improve comfort;
- Reduce fatigue;
- Work in different environments, such as home, work, hospital and travel;
- Be acceptable to the person using it (Fletcher, 2017).

Ensuring an appropriate fit for the patient (Box 1) can reduce the risk of pressure ulcers and falls, as well as promoting comfort and good posture. Encouraging patients to move from bed to chair should be a positive action that does not result in additional harm; sitting out of bed should be limited until the patient can tolerate the additional strain this imposes. To meet the myriad needs of patients in environments such as hospitals and care homes, seating solutions need to be clinically effective, easy to use and acceptable to the patient. This may involve the use of specialist cushions or chairs with inbuilt pressure-redistributing properties.

Heels

There are many types of device to prevent pressure ulcers to the heel (Table 1). The risk to the heel may range from

hypermobility to severe immobility (Fig 2) – this should be considered when selecting an appropriate heel device.

When selecting appropriate surfaces, nurses should consider the patient’s needs over a whole 24-hour period. Most organisations have local guidance for selection, but patients’ individual needs – such as comfort, body size and shape – and the environment in which the equipment will be used must also be taken into account. **NT**

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