

# A retrospective analysis of the use of the Softform<sup>®</sup> Premier Active 2 in an NHS Trust

## KEY WORDS

- ▶ Pressure redistributing mattress
- ▶ Pressure Ulcers
- ▶ Retrospective evaluation
- ▶ Softform Premier Active 2
- ▶ Survey

The identification of appropriate pressure-redistributing mattresses, to achieve positive clinical outcomes for patients and incorporate financial considerations for organisations is a challenge for healthcare staff. Pressure-redistributing equipment selection algorithms are often used to guide clinicians. An online survey was undertaken to determine the selection, application and effectiveness of the Softform Premier Active 2 mattress and a retrospective evaluation of its use over a 12 month period was carried out based on the equipment selection algorithm within an NHS Trust. The objective of this research was to review the effectiveness of the implementation of the Softform Premier Active 2 mattress for patients with grade III and IV pressure ulcers.

Pressure ulcers have a significant impact on the patient's quality of life and the financial cost of wound care is high, accounting for 3% of annual NHS expenditure (Drew et al, 2007). This cost has been estimated at £2.3billion–£3.1billion per year (Drew et al, 2007). The estimated cost of treating a grade IV pressure ulcer in the UK is £40,000–50,000 (Franks and Posnett, 2007), and they cost one UK NHS Trust an estimated £9.89million (Vowden et al, 2009). Importantly, pressure ulcers have a significant impact on patients' quality of life and the Department of Health (DH) estimates that the cost is between £363,000 and £543,000 for a grade III pressure ulcer and between £447,000 and £668,000 for a grade IV ulcer (DH, 2010). Drew et al (2007) report that the majority of these wounds are chronic in nature and are cared for in the community setting by GPs and community nurses.

A pressure ulcer is a localised injury to the skin and/or underlying tissue, usually over a bony prominence, which results from pressure or pressure associated with shear (European Pressure Ulcer Advisory Panel [EPUAP], 2014). Pressure ulcers may also be known as pressure sores, bedsores and decubitus ulcers. They are

categorised using 2014 EPUAP categorisation and range from mild discoloration of the skin to a deep wound extending to the bone and into internal organs (Romanelli et al, 2006).

The impact of factors that can influence the health-related quality of life of patients living with a chronic wound, such as changes in mobility, general functioning, control of odour and pain, are important considerations (Bradbury et al, 2008). Posnett et al (2009) emphasise that pressure ulcers are a significant cause of morbidity and mortality.

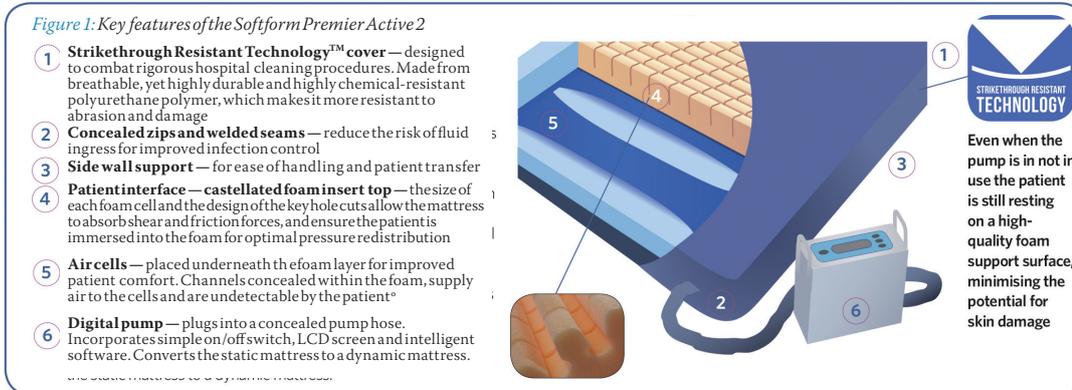
The 2014 National Institute for Health and Care Excellence (NICE) guidelines for pressure ulcers highlight the importance of a robust evidence-based strategy for the prevention of pressure ulcers. This includes the appropriate use of medical devices (Medicines and Healthcare Products Regulatory Agency [MHRA], 2014), with the selection and use of appropriate pressure-redistributing equipment playing a significant part.

Access to a range of mattress types is useful, as it provides the clinician with options that may be used to reduce pressure ulcer risk status following a holistic risk assessment (NICE, 2014). Importantly, the EPUAP (2014) does not promote

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**Figure 1: The Softform Premier Active 2 system is a ‘hybrid’ mattress with a castellated foam patient interface (Wounds UK, 2015).**

a particular brand of pressure redistributing mattress but includes practical considerations such as cost, quality, guarantee, and ease of which parts can be replaced. The ability to step up to alternating pressure should also be considered. The cause of pressure damage and the rate at which this occurs is incredibly important. Clinicians need to be aware of the decreased time it takes for pressure damage to occur when shear/friction is a consideration (Wounds International, 2010). The 2015 Nursing and Midwifery Council professional code emphasises that care should be based upon the available evidence. Indeed, healthcare organisations are required to provide a safe decontamination service. They also need to ensure the procurement, appropriate use, maintenance and repair of equipment, and make sure that health and social care professionals receive appropriate training (MHRA, 2014).

There is consensus (EPUAP, 2014; NICE, 2014) that healthcare provision should include:

- » The education and training of healthcare professionals in pressure ulcer prevention and management
- » Regular re-positioning of patients as their clinical needs warrant
- » The provision of specialist pressure-redistributing support surfaces as clinical need indicates.

The 2014 NICE guideline recommends that all individuals considered at risk of developing a pressure ulcer should be considered for a high-specification foam mattress. If this is not sufficient

to redistribute pressure, a dynamic support surface should be considered. A standard specification foam mattress should not be used for patients with an existing pressure ulcer (NICE, 2014).

### SOFTFORM PREMIER ACTIVE AND ACTIVE 2 SYSTEM

The Invacare Softform Premier static pressure-reducing mattress is a non-turn mattress with a reinforced pressure base. It has a two-way stretch vapour-permeable cover with welded seams and fully concealed welded zip. Developed in 2005, the Invacare Softform Premier Active was based upon the Softform Premier, with the addition of a layer of alternating cells inserted under the castellated foam. It consists of a layer of castellated high-specification foam cells that move independently for improved patient comfort while providing a stable support surface. The mattress has a four-way multi-stretch vapour-permeable, fluid-resistant cover, which includes Invacare’s innovative Strikethrough Resistant Technology (SRT)™ with a fully welded, concealed zip (Laidlaw et al, 2015).

The static foam mattress converts to a dynamic surface with the addition of a digital pump. The pump activates the air underlay, which alternates on a 10-minute cycle. It uses software to assess a patient’s weight in order to supply the appropriate level of air, to create an alternating surface that is equivalent to a stand-alone dynamic support. It has a 248kg weight limit. The pump weighs 2kg and the mattress weighs 13kg. The product has an 8-year warranty for the foam, a

4-year warranty for the cover, and 2-year product support for the pump. The alternating insert operates on a two cell–10-minute cycle and it is possible to upgrade from the Softform Premier. The combination therapy system has developed from the traditional static or dynamic support surface and the Softform Premier Active is becoming widely recognised as a ‘hybrid’ mattress (see *Figure 1*).

**EVIDENCE SUPPORTING THE USE OF SOFTFORM PREMIER ACTIVE**

Previous research undertaken by Thompson (2006) discussed two patient care studies involving a total of 40 patients with a Waterlow (1995) score of 18–30, with or without a grade I or II pressure ulcer (EPUAP, 1998). Thompson identified patients with a number of clinical conditions who were nursed on the mattress, including age-related general deterioration, cancer, cystic fibrosis, bariatric issues, renal failure, cardiac failure, and diabetes, as well as post-operative recovery. Thompson concludes that, used in conjunction with a pressure ulcer prevention strategy, the Softform Premier Active may be used in the prevention and treatment of pressure ulcers for high-risk patients and has the potential to reduce the reliance on alternating-pressure air mattresses.

Gray et al (2008) undertook a study to compare the effect of using the Softform Premier Active versus a standard air mattress on pressure ulcer

incidence in two elderly care wards. The mean age of the 50 patients in the study was 82.4, and the average Waterlow score was 22.2 (range 17–29). Of the 50 participants, four elderly patients developed a grade II pressure ulcer (three sacral ulcers and one heel ulcer). Four patients who were placed on the comparison mattress, a dynamic air mattress, also developed a pressure ulcer (two sacral and two heel ulcers). It was concluded that the 8% incidence of pressure ulcer development in this particular group was ‘surprisingly low’ and that the Softform Premier Active was as effective as the standard air mattress.

Stephen-Haynes (2010) undertook a 20-patient survey of the Softform Premier Active. The patients’ ages ranged from 45 to 99 (mean age, 71.3 years) and weighed between 51 kg and 159 kg. The participants had Waterlow risks ranging from 11–25: eight with intact skin, one with grade I ulceration, nine with grade II ulceration and two with grade III ulceration. Of the 20 patients, ten showed signs of skin improvement within 2 weeks, and none of the patients’ skin conditions deteriorated. Fourteen patients found the mattress to be more comfortable than previous equipment, four found it to be as comfortable, and two did not comment on this.

Two patients reported an improvement relating to motion sickness, one found it decreased spasms and one found their sleep pattern improved. The audit therefore indicated that despite significant age, chronic illness and palliative care needs, the Softform Premier Active mattress was able to offer a number of clinical benefits (Stephen-Haynes, 2010). In addition to highlighting clinical benefits, Adams (2014) demonstrated that installing hybrid technology with a foam interface led to cost savings in excess of £1.85 million over a 7-year period in a 600 acute bed NHS Trust. These cost savings related to reduced outlay for decontamination and mattress and bed rental expenditure.

**Online survey**

In this study, an online survey of the use of the Softform Premier Active 2 (SPA2) mattress in the community setting was undertaken over a 7-week period from 13 April to 1 June 2015. The survey covered:

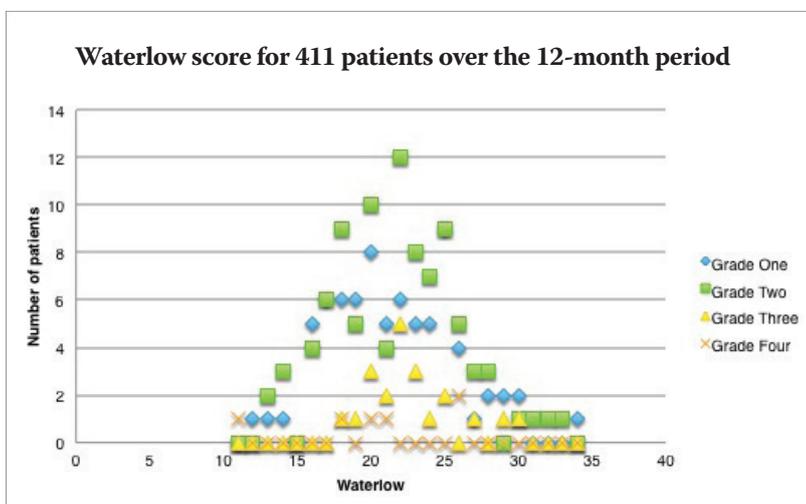


Figure 2. Waterlow score of patients with pressure ulcers who were nursed on a Softform Premier Active 2 mattress during the 12 months analysed.

- » The rationale for use
- » The rationale for selection, i.e. whether the mattress was chosen for prevention or treatment
- » The medical diagnosis having the most impact on the patient's health
- » Level of mobility
- » Waterlow score
- » Grade and location of the pressure ulcer (if present)
- » Level of effectiveness
- » Comfort, ease of re-positioning, ease of use, cleaning, and patient transfer
- » Staff training requirements.

There were 22 completed surveys, 91% of which were completed by district or community nurses, 5% by community hospital nurses and 4% by tissue viability nurses. Three-quarters of respondents stated they had selected the SPA2 to improve patient comfort and 67% to improve skin integrity. The rationale for selection varied: it was the first choice for 45% of respondents, 45% chose it for step-up therapy and 10% for step-down therapy. In 16 cases (73%), the prescribers had selected the SPA2 mattress system to prevent the development of a pressure ulcer. There were six cases in which the mattress was selected for the treatment of an ulcer, three of which were recorded as being grade II ulcers and three were grade III. Of the existing ulcers, four were located on the sacrum and two on the hips. The medical diagnosis having the most impact on patients' health are given in *Table 1*.

The mobility levels of patients varied, with the mattress being selected for patients with restricted mobility in 45% of cases, for chair-bound patients in 9% in instances, and for bedbound patients in 32% of cases. In 14% of cases, the mattress was chosen for patients who were apathetic. All patients were at risk of ulceration, with 41% having a Waterlow score of 20 or more and being at very high risk, and 55% having a score of 15 or more, and therefore being at high risk.

Prescribers reported that they had seen an improvement in the patient's skin within 2 weeks of prescribing the SPA2 mattress system in 50% of cases. All prescribers rated the SPA2 mattress system as being good/very good, with 95% indicating that the system was easy to use and 91%

**Table 1. The medical diagnosis with the most impact on participating patients' health**

Diagnosis	Number of patients
Palliative	8
Motor/sensory	6
Terminal cachexia	2
Single organ failure	2
Multiple organ failure	1
Elderly/frail	2
Other	1

**Table 2. Waterlow risk assessment results for different grades of ulcer**

Grade of ulcer	Waterlow score			
	Range	Mode	Mean	Median
I	12–34	25	4	23
II	13–33	22	5	23
III	18–30	22	1.6	24
IV	11–26	none	1	18.5

rating the system as easy to clean. Ease of patient transfer when using the mattress system was rated good/very good in 95% of responses.

Ninety-one per cent of the 22 prescribers indicated that they would recommend the SPA2 mattress system to a colleague. Eighty-two per cent said that they would be likely to use the system again, with the two main reasons being that it was quiet (100%) and that it had a positive effect on pressure ulcers (100%). The majority of prescribers (86%) recorded they did not require further training on the SPA2 mattress system, however the 14% that indicated they required further training highlighted a training need.

**OUTCOMES**

This online survey study found that the SPA2 mattress system was used to improve skin integrity and patient comfort. However 73% overprescribed the SPA2, using it for prevention rather than treatment when utilising the selection algorithm for pressure-redistributing surfaces. This prompted a retrospective audit of the use of the SPA2 over a 12-month period, exploring its use in patients with deep pressure ulcers (grades III and IV).

Table 3. Details of patients with grade III ulcers nursed on a Softform Premier Active 2 mattress.

Patient no.	Sex	Waterlowe risk score	Ulcer location	Diagnosis	Continence	Mobility
1	F	23	Sacrum	Orthopaedic	Catheterised	Apathetic
2	F	27	Hip	Motor/sensory	Incontinent, urine and faeces	Chair-bound
3	F	24	Heel	Motor/sensory	Incontinent, urine	Chair-bound
4	M	22	Heel	Motor/sensory	Incontinent, urine	Chair-bound
5	F	19	Sacrum	Motor/sensory	Catheterised	Restricted
6	F	23	Buttock	Motor/sensory	Incontinent, faeces	Restricted
7	F	20	Heel	Orthopaedic	Incontinent, urine	Chair-bound
8	M	18	Heel	Other	Incontinent, urine	Chair-bound
9	F	22	Sacrum	Other	Incontinent, urine	Restricted
10	F	25	Sacrum	Other	Incontinent, urine and faeces	Apathetic
11	F	20	Buttock	Other	Catheterised	Restricted
12	F	21	Sacrum	Other	Catheterised	Mobile
13	F	20	Other	Other	Catheterised	Apathetic
14	F	29	Sacrum	Other	Catheterised	Chair-bound
15	F	22	Buttock	Other	Catheterised	Apathetic
16	F	22	Other	Peripheral vascular disease	Catheterised	Mobile
17	M	22	Elbow	Single organ failure	Catheterised	Restricted
18	M	23	Sacrum	Terminal cachexia	Catheterised	Restricted
19	F	30	Sacrum	Terminal cachexia	Catheterised	Restricted
20	F	25	Buttock	Terminal cachexia	Incontinent, urine	Bedbound
21	F	21	Spine	Motor/sensory	Catheterised	Restricted

**EVALUATION OF MATTRESS USE OVER A 12-MONTH PERIOD**

The SPA2 mattress was used by 411 patients over the 12 months that were evaluated. It was used in the management of 76 patients with grade I pressure damage, 95 patients with grade II pressure damage, 21 patients with grade III pressure damage, and six patients with grade IV damage. The Waterlow risk assessment results are given in Table 2 and Figure 2.

**Patients with a grade III pressure ulcer**

There were 21 patients with a grade III pressure ulcer who were nursed on a SPA2 mattress. Their details are given in Table 3.

Of these 21 patients, the mattresses were used for end-of-life care in six instances. Ten mattresses were used on an on-going basis in accordance with the equipment selection flowchart. Use of the mattress resulted in the healing of pressure ulcers in eight patients, and these patients' mattresses have been downgraded to a Softform Premier or the patient's own mattress. One patient was

upgraded to an alternative pressure mattress due to a history of pressure damage.

**Patients with a grade IV pressure ulcer**

There were six patients with a grade IV pressure ulcer who were nursed on a SPA2 mattress (Table 4). Their cases are discussed individually below.

**Patient 1**

A 76-year-old man with multiple sclerosis who developed a grade IV pressure ulcer. His contractures and poor nutrition caused by his swallowing problems were significant factors in the development of his pressure ulcer. The clinical staff recommended the SPA2, as he had experienced a loss of movement on the previous alternating pressure mattress. It was hoped the SPA2 would increase his mobility level. The lack of alternating pressure and movement of the cells within the SPA2 mattress lead to a reduction in the spasms he experienced.

In March 2015, he was transferred to a care home for palliative care. He was determined

**Table 4. Details of patients with grade IV ulcers nursed on a Softform Premier Active 2 mattress.**

Patient no.	Age	Waterlow score	Ulcer location	Diagnosis	Continence	Mobility	Outcome
1	76	20	Hip	Multiple sclerosis	Catheterised	Chairbound	Healing
2	76	18	Buttock	Single organ failure	Catheterised	Mobile	Healing
3	73	26	Buttock	Multiple sclerosis	Catheterised	Chairbound	Healing
4	84	21	Sacrum	Single organ failure	Incontinent, urine	Mobile	Healing
5	80	11	Heel	Orthopaedic	Incontinent, urine	Restless	Healing
6	64	26	Sacrum	Tetraplegia	Catheterised, faecally incontinent	Chairbound	Healing

to take his mattress with him as he found it comfortable and it did not aggravate his spasms. The wound was healing at this time and his other skin remained intact. His general health and multiple sclerosis was deteriorating, and due to repeated chest infections he passed away.

**Patient 2**

A 79-year-old male with acute renal failure was discharged from hospital in March 2015 with a grade IV pressure ulcer to his buttock following a period of being very unwell and immobile. He had expressed a need for greater mobility, and on his return home the patient was nursed on a SPA2 mattress, which enabled him to continue with his rehabilitation and increase his independence. He found the mattress easy to move on and get off in comparison to the previous alternating-pressure mattress. The grade IV pressure ulcer had healed by August and he stepped down to a Softform high-specification foam mattress.

**Patient 3**

A 73-year-old woman who developed a grade IV pressure ulcer following problems with her seating and the change in posture due to her multiple sclerosis, had previously tried alternating pressure mattresses but had experienced an increase in her tone and found they caused lower back pain. When the ulcer initially developed, the woman was very reluctant to utilise any pressure-reducing mattress due to the problems she had experienced in the past. She finds the SPA2 mattress to be comfortable and no longer has the increased tone/spasms or lower back-ache. Her pressure ulcer is continuing to heal well and would currently be classified as grade II.

**Patient 4**

Patient 4 was 84 years old and had a grade IV sacral ulcer. She lived alone but was unwilling to accept support at home. She had been less mobile due to heart failure and had several recent urinary infections. She developed the grade IV ulcer in April 2015, which is when the district nurse team became involved. The SPA2 mattress was selected as this would enable her to maintain her mobility and independence, enabling her to get in and out of bed unaided. This ulcer is healing slowly, so she is still being nursed on the SPA2.

**Patient 5**

An 80-year-old woman with a diagnosis of dementia who was very restless and had limited mobility had a fall and fractured her hip. Following a hip replacement she developed a grade IV ulcer to her heel. The SPA2 mattress was selected due to her dementia, as patients with dementia are unable to tolerate alternating pressure.

The pressure ulcer was healing with all other skin intact when the patient passed away suddenly.

**Patient 6**

A 54-year-old man with quadriplegia, tracheostomy and urinary catheterisation developed a grade IV sacral pressure ulcer after an acute illness and hospitalisation. He was initially nursed on an alternating air-pressure mattress. Following review by the consultant tissue viability nurse, a SPA2 mattress system was provided as the patient and his wife said that the noise from the air-pressure mattress prevented them from sleeping. The patient commented that: ‘The effects of the mattress and its benefits were instantaneous.

Sleep was brilliant because there was no noise from the mattress. I didn't feel movement from my initial position and I did not slip down the bed at all.'

His wound, which measured 7 cm x 6 cm, is now 3 cm x 3 cm and despite his faecal incontinence is now manageable and presents as a shallow ulcer.

### DISCUSSION

The selection of appropriate pressure-redistributing mattresses should take account of risk factors for the development of pressure ulcers and clinical outcomes. The evaluation of the use of SPA2 mattresses over a 12-month period has highlighted that it has been used effectively for the management of many patients with deep pressure ulcers. The patients were frequently allocated a SPA2 mattress, as they were unable to tolerate alternating pressure. While the use of the SPA2 mattress was not previously recommended for patients with grade IV ulcers in the pressure-redistributing equipment selection algorithm, the data and care studies demonstrate that it has been clinically effective in the maintenance and treatment of patients with such ulcers.

The choice of redistributing mattress will also be influenced by reimbursement and funding issues. The SPA2 mattress has a lower unit cost than many alternating-pressure mattresses and is therefore an attractive option.

### CONCLUSION

This article outlines the importance of the identification of appropriate pressure-redistributing mattresses to achieve positive clinical outcomes for patients and save money. The outcomes of the online survey and retrospective evaluation of the use of the SPA2 mattress within an NHS community trust over a 12-month period has identified the effectiveness of the implementation of the SPA2 mattresses for patients with grade III and IV pressure ulcers.



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