Evaluating Dermisplus® Prevent for the avoidance of development of medical device-related pressure ulcers

KEY WORDS
- Dermiplus Prevent
- Evaluation
- Medical device-related pressure ulcers
- Pressure ulcer prevention

Medical device-related pressure ulcers (MDRPUs) can be a key indicator of patient safety and nursing quality in healthcare settings (Jackson et al, 2019). Preventing the development of this type of pressure ulcer can be challenging since the medical device may be an essential part of the patient's care and treatment plan (Black and Kalowes, 2016). The use of silicone between the skin and the device has been recommended as one method of reducing the risk of developing MDRPUs (Galetto et al, 2019). **Aim:** To assess how well Dermisplus Prevent maintains skin integrity compared to the current product used. **Method:** Twenty evaluation forms for Dermisplus Prevent were completed to assess its performance against specific criteria. **Results:** The product was well reviewed when assessing pressure redistribution, ease of use and patient comfort. All staff reported that the product performed better than or the same as the current product used in practice. **Conclusion:** Dermisplus Prevent appears to be an effective and cost-effective product to assist in the prevention of pressure ulcers, including MDRPUs.

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Pressure ulcers continue to be a challenge in many healthcare settings, despite national and local initiatives aiming to reduce them (NHS Improvement, 2018; 2019 National Wound Care Strategy Programme, 2020). A pressure ulcer that has developed due to the presence of a medical device (designed and applied for diagnostic or therapeutic purposes) is called a medical device-related pressure ulcer (MDRPU) (NHS Improvement, 2018).

Any adult or child patient with conditions that require the use of medical devices may be at risk of developing pressure ulcers at the sites at which these are used. However, patients cared for at intensive care units are at a greater risk of developing MDRPUs (National Pressure Ulcer Advisory Panel [NPUAP], European Pressure Ulcer Advisory Panel [EPUAP] and Pan Pacific Pressure Injury Alliance [PPPIA], 2014; National Institute for Health and Care Excellence [NICE], 2015).

Jackson et al (2019) stated that MDRPUs can be a key indicator of patient safety and nursing quality in healthcare settings. They described this type of pressure ulcer as a significant public health issue, because of the associated costs to patients in terms of pain and impact on their quality of life, and to the NHS in terms of treatment costs.

THE SIZE OF THE PROBLEM

It has been reported that 11.9% of pressure ulcers are MDRPUs (Van Gilder et al, 2009) and that 50% of hospital-acquired pressure ulcers are MDRPUs (Pittman et al, 2015). However, this is still an area which is understudied, with differences and inconsistencies in assessing, recording and reporting MDRPUs. An accurate incidence rate is not known (Barakat-Johnson et al, 2019). It is thought that MDRPUs are under-reported and they have been described as a 'hidden' category of pressure damage. NHS Improvement in the 'Pressure Ulcers: Revised Definition and Measurement Framework' recommend that Tissue Viability Nurses (TVNs) code and record MDRPUs in their local incident reporting systems and the National Reporting and Learning System (NHS Improvement, 2018).

Prevention of these pressure ulcers is more challenging since the device may be an essential part of the patient's care and treatment and cannot

be removed (Black and Kalowes, 2016). Mehta et al (2019) suggested that MDRPUs develop for many reasons, including that the devices are often made of rigid material which may rub or cause pressure to the tissues underneath them; the presence of oedema; tight securement to maintain an effective seal; heat and humidity at some sites; and poor device selection including the size. In addition, poor tissue oxygenation, poor nutrition, reduced sensory perception and/or the ability of the patient to communicate pain or discomfort at the site of a device have been discussed. Importantly, these devices are often essential and lifesaving, which is why staff may be reluctant to disturb the device for fear of causing displacement (Dyer, 2015).

Medical devices commonly cited as causing pressure damage include:

- Anti-embolic stockings
- Cervical collars
- Endotracheal tubes/tracheostomy tubes
- Face masks for non-invasive positive pressure ventilation
- Faecal containment devices (e.g. Flexiseal)
- Nasal cannulas
- Pulse oximetry probes
- Radial artery catheters/venflon
- Sequential compression devices
- Splints and braces
- Urinary catheters
- Plaster of Paris.

Galetto et al (2019) identified that respiratory devices, such as non-invasive ventilation masks and endotracheal (ET) tubes, have been shown to cause the most damage.

Many MDRPUs develop not necessarily because of the device itself but from poor positioning or securement and failure to inspect under the devices. As healthcare providers, it is essential that patients with a medical device are provided with a pressure ulcer prevention plan that aims to maintain skin integrity. MDRPUs can result in full-thickness skin loss due to the lack of fatty tissue at many of these sites (Black and Kalowes, 2016).

ACTIONS TO REDUCE THE RISK OF DEVICE-RELATED PRESSURE ULCERS

Actions which have been suggested to reduce the risk of these pressure ulcers include correct size, positioning and fixation of equipment (Apold and Rydrych, 2012). Securing the device without so much tension and repositioning the device where possible, are also advised (Black and Kalowes, 2016). The use of a silicone product (or dressing) between the skin and the device (e.g. face mask) is recommended, in addition to regular skin inspection and review of the requirement for the device and removal when it is no longer clinically indicated (Galetto et al, 2019).

NEW PRODUCT EVALUATION

An evaluation of Dermisplus Prevent by Frontier Medical was undertaken to assess its performance against specific criteria: pressure redistribution, ease of cutting, ability to stay in position, ease of cleaning, integrity and patient comfort. This was used as an alternative pressure-redistributing aid to the product currently used in practice and with a focus on its use with medical devices.

ABOUT DERMISPLUS PREVENT

Dermisplus Prevent — a range of pressure-redistribution pads and strips — is designed to decrease peak pressures, thereby reducing the risk of developing pressure ulcers, including MDRPUs. It has been shown to reduce peak pressures by 10% more than a competitor's product (Taylor and Webber, 2016). This product is made from a tri-polymer gel and mineral oil and redistributes peak pressures over a wider surface area, thus reducing the risk of pressure-related tissue damage. One example is its application to the bridge of the nose when Continuous Positive Airway Pressure (CPAP) masks are in use and a seal is required *(Figure 1)*. Other examples show its application under a tracheostomy tube *(Figure 2)* and ET tube *(Figure 3)*.

ETHICAL APPROVAL

Full ethical approval was not required as this was a market evaluation; however, ethical principles were considered and adhered to, such as data protection. Evaluation forms were anonymised for use in this study.

METHOD

- A four-week evaluation of Dermisplus Prevent on four intensive care unit (ITU) beds was conducted November — December 2018.

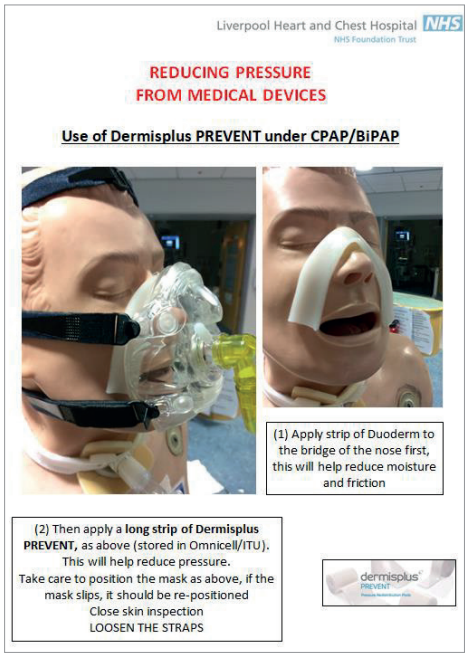

Figure 1. Use of Dermisplus Prevent under CPAP/Bilevel Positive Airway Pressure (BiPAP)

Figure 2. Use of Dermisplus Prevent under a tracheostomy tube

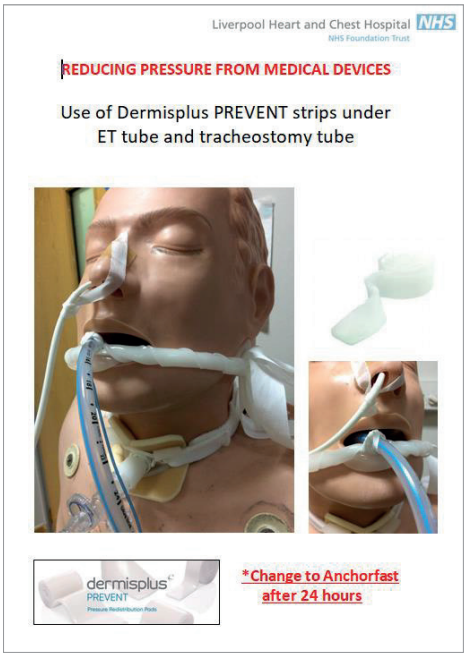

Figure 3. Use of Dermisplus Prevent under ET tube and tracheostomy tube

- The aim was to receive 20 completed evaluation forms from ITU staff.
- Different sizes of the product were made available and kept in a trolley in the clinical area. These included:
  - 10 cm x 10 cm x 1.2 cm
  - 10 cm x 10 cm x 0.3 cm
  - Strip 30 cm x 5 cm x 0.3 cm
  - Strip 50 cm x 2.5 cm x 0.3 cm
- Evaluation forms were made available and company staff provided more at their visits
- Company staff provided staff training and visited ITU several times during the evaluation period, supplemented with daily telephone calls to encourage engagement and evaluation form completion
- In addition, TVNs visited ITU frequently to support staff.

RESULTS

Eighteen completed evaluations were collected. The mean (25.2) and the median (25) Waterlow scores were both high. This suggests that the patients included in the evaluation were at higher risk of developing pressure ulcers, and was expected as the evaluation was conducted on patients within critical care.

Table 1 lists the anatomical sites where the product was used. Staff did use the product at other sites but, primarily, the evaluation intended to focus on pressure ulcer prevention under medical devices such as under ET tubes, tracheostomy tubes and CPAP (38% included under 'head/face').

Table 2 details what staff had selected as the objective of using the product. Most selected pressure ulcer prevention over bony prominences (65%); a quarter (27%) selected pressure ulcer prevention for device-related specifically. However, staff may have selected 'bony prominence' under medical devices such as CPAP.

Table 3 outlines the method of securement. 'None' was selected in most cases (47%); followed by retention bandages 40% (e.g. for elbows). Staff may have selected 'none' if no additional product was used to secure it and where its position was maintained by the device *(Figures 1–3)*.

Table 4 summarises the staff evaluation of the product and recorded patient feedback relating to comfort. Pressure redistribution: scored either 'excellent' or 'good' in all evaluations, suggesting that the product was effective in redistributing pressure and maintaining skin integrity.

Table 1. Location of Dermisplus Prevent on the patient				
Heel	**Elbow**	**Sacrum**	**Head/face**	**Other**
3	10	2	10	1
12%	38%	8%	38%	4%

Table 2. Objective of use				
Pressure ulcer prevention (PUP) over bony prominences	**PUP device related**	**Category 1 PU**	**Deep tissue injury management**	**Other**
17	7	1	1	1
65%	27%	4%	4%	4%

Table 3. Method of securing				
None	**Retention bandage**	**Medical device**	**Clothing**	**Tape**
14	12	4	0	0
47%	40%	13%	0%	0%

Table 4. Staff evaluation of product				
Criteria/score	**Excellent**	**Good**	**Satisfactory**	**Poor**
Pressure redistribution	7 (44%)	9 (56%)		
Ease of cutting	7 (54%)	5 (38%)	1 (8%)	
Ease of cleaning	11 (61%)	6 (33%)	1 (6%)	
Ability to stay in position	7 (39%)	9 (50%)	2 (11%)	
Integrity	8 (57%)	6 (43%)		
Patient comfort	10 (67%)	5 (33%)		

Ease of cutting and cleaning: staff found it to be an easy product to cut and clean, and scored 'excellent' or 'good' in most evaluations.

Ability to stay in position and integrity of the product: scored 'excellent' or 'good' in most evaluations.

Patient comfort: patients who were able to communicate scored whether the product helped with comfort. 'Excellent' was recorded in 2/3 of evaluations and the remainder was scored as 'good'.

Additional information and results:

- The most used size was strip 10
- No pressure damage was reported on areas where the product was used
- Maximum use was for one week
- When wrapped around ET tubing, it did not crack or break as staff reported the current product had done at times
- Comments by staff included:
  - *"Good, easy product to use."*
  - *".. thicker, seems more durable, doesn't easily tear, doesn't seem wet like the last one."*
- Only one comment made by a staff member had a potential concern: *"I wonder if the thickness of the 1.2 cm product would cause indentation on an oedematous area."*
- All staff reported that the product was better than (7) or the same as (10) the previous product used.

DISCUSSION

The evaluation of Dermisplus Prevent was successful. The product performed either better or as good as the current product in use and at a lower cost, proving itself to be effective and cost-effective. Dermisplus Prevent is flexible, adaptable, durable and staff felt that it was easy to use and apply. Patients did not show any discomfort when using the product.

CONCLUSION

Following a successful evaluation and being committed to preventing pressure ulcers at site of medical devices, it was decided to use Dermisplus Prevent as a pressure-redistributing aid as part of patients' overall pressure ulcer prevention plan, including its use under medical devices such as ET tubes, tracheostomy tubes, CPAP/BiPAP and high flow oxygen masks.

As an action following a local pressure ulcer incident, Dermisplus is now located next to NIV masks. Other preventative aids are bundled up with the device so that they are applied at the same time when first used, thus avoiding delays in implementing pressure ulcer prevention strategies (Black and Kalowes, 2016). WUK

DECLARATION OF INTEREST

The author has no conflicts of interest to report. The evaluation was led by Samantha Mills, Tissue Viability Specialist Nurse and Julie Tyrer, Tissue Viability Nurse Consultant, Liverpool Heart and Chest NHS Foundation Trust

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