Prescribing equipment that is appropriate to a patients highly complex needs to reduce pain and improve quality of life: a case study

KEY WORDS
- Anti-deformation mattress replacement system
- Care package
- Community nursing
- Pressure ulcer

Abstract: Delivering appropriate care to patients within the community setting is complex, particularly for those who are at very high risk of a pressure ulcer (PU). The most frequent challenges include an inability to provide the same frequency of care as in a hospital setting, and the non-adherence of patients with the equipment, both resulting in poor outcomes. In this case study, Ms X has a complex medical history and was being managed on an alternating pressure air mattress because of her very high risk status and existing category 2 PU. Plans were being made to discharge Ms X, during which time her complex needs were discussed, including discomfort, pain, lack of sleep, poor appetite and concern of further skin deterioration. As there was no existing Trust equipment stock that was felt would provide a suitable support surface, the Carital Optima (Direct Healthcare Group, UK) was proposed as a suitable solution. The change to this surface improved Ms X's comfort and sleep, while healing her category 2 PU. This improved Ms X's quality of life, which was delivered through the provision of a specialised system that was well suited to her highly complex needs.

JANE JONES
Clinical Nurse Specialist Tissue Viability, North Cumbria Integrated Care NHS Foundation Trust

Delivering care to patients at very high risk of a pressure ulcer (PU) is complex in any setting, yet in the community, there are many additional challenges. The most common of these challenges is the inability to provide the same frequency of care as in a hospital setting, even with a full support package offering visits four times a day (usually between 7am and 8pm), unless specific overnight care is required. Consequently, vulnerable and complex patients are often not repositioned as frequently as they would be in an acute setting. Often this care at home is supplemented by family members to ensure the patient has appropriate support, but this is not always possible.

Central to delivering care in the community setting is the concept of personalised support and care planning, addressing what's not working in the person's life and identifying outcomes and actions to resolve them. This relies on a series of facilitated conversations, in which the person, their family and friends, or those who know them well, actively participates to explore the management of their health and wellbeing within the context of their whole life and family situation (National Health Service England, 2021).

Patient non-adherence is one of the common clinical concerns when selecting and using pressure redistributing equipment and can result in poor outcomes. It was noted in a large-scale randomised controlled trial that there was reduced patient adherence with alternating mattresses — this related to their comfort and sensory aspects of use, including noise, and noticing and disliking the alternation (Nixon et al, 2019). Often non-adherence is as a result of poor communication with the patient, either from not fully explaining the purpose of the equipment or not listening to why the patient may not like or tolerate the equipment. Giving information is a complex process that requires consideration of who the recipient is, and how that person may best receive

information. Much may also be situation dependant, for example, communicating with a patient when they are in pain or have recently received bad news may not result in the best outcome (Fletcher, 2020). Giving information forms part of the 7-step aSSKINg bundle, which has been established for many years. Evidence shows that the bundle can help to improve clinical care (McClough, 2016).

CASE STUDY

Ms X is a 78-year-old lady who has a complex medical history including osteoarthritis being treated with dexamethasone, and a breast malignancy with spinal secondaries that has resulted in lower limb paraplegia.

Ms X had been hospitalised for assessment of her general deterioration in health, reduced mobility and for pain management. Initially she was cared for on an alternating pressure air mattress (APAM) replacement system because of her very high risk status (assessed as scoring 26 on the Waterlow Score). Despite this, she had a category 2 PU and moisture-associated skin damage (MASD) related to incontinence of urine and occasional faecal incontinence.

While hospitalised, a 2-hourly turning regimen was maintained to prevent further deterioration of her skin. Ms X was able to sit-out for short periods (a maximum of 1.5 hours) at mealtimes to assist with eating. She found eating in bed difficult, and her appetite was poor. She required the use of a hoist to transfer from bed to chair due to the paraplegia, but found the transfer quite tiring. Although eating while sat in the chair was much easier, she sometimes found the effort to be too much, so would remain in bed.

Ms X's low mood following her recent paraplegia diagnosis was of further concern and had a significant impact on her quality of life (QoL). She did not feel comfortable on her mattress; this was affecting her sleep and low mood and causing her to feel fatigued. Plans were being made to discharge her as she was no longer in need of the acute care delivered in the community hospital. It was felt that this would improve her mood. A care package was negotiated that included four daily and twice nightly visits. Despite this, the family were concerned about the risk of further skin deterioration and damage.

Ms X was reviewed by the ward nurses and the tissue viability team who listened to the concerns raised surrounding Ms X's discomfort and lack of sleep. The family's concerns regarding Ms X's complex needs were also discussed (e.g. further deterioration in her skin condition, poor appetite and reduced intake), and the decision was taken to liaise with the ward multidisciplinary team and the community nurses for discharge planning.

There was no existing Trust equipment stock that would provide a suitable support surface to overcome Ms X's complex challenges. Selecting equipment for patients with such complex needs at very high risk can be challenging.

Fletcher (2019) suggests that the following factors should be considered:

- The patient's level of mobility and activity — Ms X was paraplegic so had no movement from the waist down. Although she had upper body movement, she did not have sufficient body strength to reposition herself in bed, and required hoisting for any transfers between bed and chair
- Specific requirements to manage the microclimate (temperature and humidity between the patient and surface) — Ms X already had MASD to the sacrum because of her incontinence
- Patient's weight and size — Ms X was of average weight and height
- Presence of existing PUs — Ms X already had a category 2 PU to her sacral area
- Patient's level of risk for developing new PUs — Ms X was deemed to be at very high risk of developing further skin damage as per the Waterlow score of 26 and pre-existing PU.

The Carital Optima mattress (Direct Healthcare Group, UK) was proposed as a suitable solution for Ms X's high level of risk because it offers enhanced envelopment and immersion therapeutic benefits to manage complex needs (i.e. pain, comfort, sleep and overall QoL). The air cell structure minimum pressure mattress maximises the contact area, while minimising the contact pressure and tissue deformation.

Tissue deformation

Recent clinical studies suggest that tissue viability can be compromised in a matter of minutes. These new insights on PU aetiology suggest a gradual degradation of cell structures subjected to bodyweight or other external forces — this is demonstrated in the "damage cascade" (Gefen and Soppi, 2020; *Figure 1).*

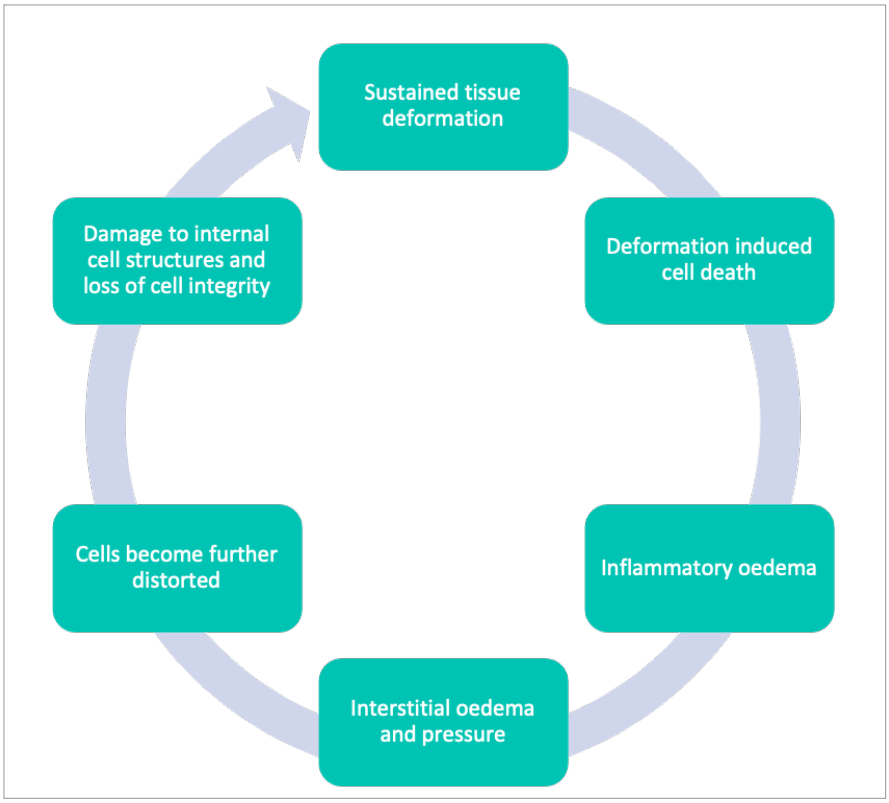

Figure 1. The tissue deformation "damage cascade"

A dynamic, anti-deformation mattress replacement system

The Carital Optima is specifically designed for patients considered to be at "high risk" and "very high risk" of PU development. It is a dynamic electrically powered mattress that is neither an APAM nor a low air-loss system, but functions by supporting the patient with the air-cells filled at lower pressures than that needed for an APAM (Thompson et al, 2008). The Carital Optima offers high levels of patient comfort and uses continuous low pressure to provide pressure redistribution through high levels of immersion and envelopment (Direct Healthcare Group, 2022; *Figure 2)*. Clinicians felt that the change from alternating pressure to continuous low pressure would address the main problems of discomfort and lack of sleep experienced by Ms X, and would also address the concerns of the family (i.e. preventing further skin deterioration and damage).

The oval to the left of *Figure 2* demonstrates how the body can be immersed into a surface. Immersion is defined as the depth of penetration into a surface. The oval to the right of *Figure 2* demonstrates how a surface can envelop the patient and how this distributes the pressure and reduces deformation. Envelopment is defined as the ability of a support surface to conform around the patient's body.

It is noted that good envelopment is associated with low interface pressures and shear, as more of the body surface area is in contact with the support surface and the body weight loads are transferred more uniformly (Call and Cheney, 2020; Call et al, 2020). The larger the contact area for the load transfer, the smaller the localised cell and tissue deformations, and tissue stress concentrations. A support surface that continuously provides good envelopment regardless of patient body characteristics and position fulfils the primary requirement for being effective in PU prevention (Lustig and Gefen, 2022). Therefore, it was considered that the Carital Optima would be a credible solution to manage Ms X's pain, while also preventing further damage to her skin tissue.

RESULTS

The tissue viability nurse, the ward staff and community team had no previous experience of using the Carital Optima before Ms X. However, based on the main objectives of care, the mattress offered a good solution to her highly complex needs. The change from Ms X's previous mattress surface (APAM) to the Carital Optima improved

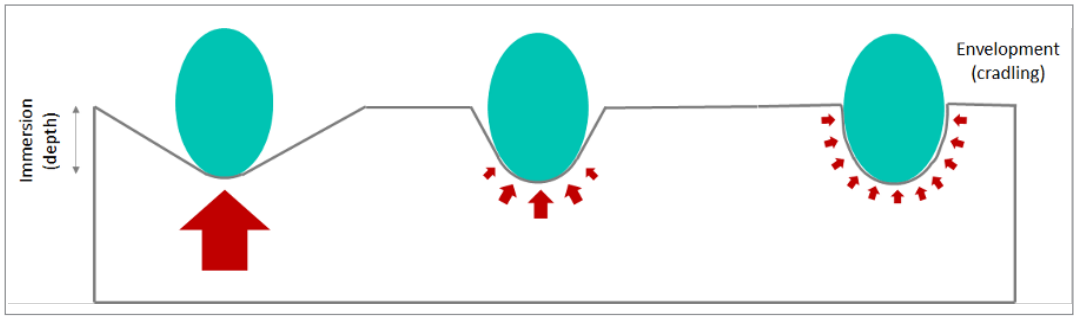

Figure 2. Visualisation of the impacts of immersion and envelopment on pressure redistribution

her comfort and, therefore, her sleep. It is well documented that improving the quantity and quality of a patient's sleep has a significant impact on their overall wellbeing and improves their stamina and coping abilities (Gefen and Soppi, 2020).

Ms X was discharged home with the full care package of six visits (four daily and twice nightly), which was supported throughout the day by her family and the community nursing team. Following the healing of the category 2 PU, Ms X was able to tolerate the process of being hoisted more. She was less tired and in less discomfort and pain, which enabled Ms X to sit-out in a riser recliner with a pressure redistributing cushion. This significantly improved her ability to complete activities of daily living (ADL), such as eating, drinking and watching television and, therefore, provided a better QoL. All of these factors are known to contribute to improvements in the PU healing process. The envelopment and immersion properties achieved by using the Carital Optima, supported by a management plan for faecal incontinence (regular bowel movements using a bowel emptying system and anal plugs), will have contributed to the good healing time of Ms X's category 2 PU and MASD. The interactions between PU aetiology and pain pathways are complex. However, the alleviation of sustained tissue deformation through good immersion and envelopment of the support surface are considered to protect against PU development, and relieve chronic or general pain (Gefen and Soppi, 2020).

Ms X has been cared for at home with a full package of care and district nurse support for 3 months. Ms X's PU remains healed and her QoL much improved. The family commented that they are "absolutely thrilled" with the improvement in Ms X's QoL, and are no longer as anxious about her tissue deteriorating as they have seen the benefits of using an appropriate support system that supports her highly complex needs.

CONCLUSION

While it is easy to follow local protocols when selecting equipment to achieve good outcomes for the majority of patients, some patients have very specific and often complex needs that are not always met by standard protocol. The tissue viability team were able to suggest an evaluation of a new product that offered a better solution by working with the patient, her family and the nurses caring for her. Ms X and her family were willing to try the Carital Optima mattress because they felt their concerns had been listened to and heard. It was also felt that the mattress offered a specific clinical solution to Ms X's highly complex needs by using continuous low pressure to provide pressure redistribution through high levels of immersion and envelopment, resulting in increased patient comfort.

The patient outcomes were very positive both physically and psychologically and, despite the unchanged long term outcome for Ms X, it is felt that the provision of a specialised system that was well suited to her highly complex needs helped to improve her QoL. WUK

REFERENCES

Call E, Cheney A (2020) Developing standard test methods for assessment of medical devices in the field of wound prevention and care. In: Gefen A. Innovations and Emerging Technologies in Wound Care. Academic Press: London

Call E, Tanner L, Cheney A et al (2020) Results of laboratory testing for immersion, envelopment, and horizontal stiffness on turn and position devices to manage pressure injury. *Adv Skin Wound Care* 33(10S Suppl 1): S11–22. https://doi.org/10.1097/01.asw.0000696412.04000.98

Direct Healthcare Group (2022) Carital Optima. https://tinyurl.com/495b7mrn (accessed 20.08.2022)

Fletcher J (2019) Pressure ulcer education 4: selection and use of support surfaces. *Nurs Times* 116(1): 41–43. https://tinyurl.com/ystdukep (accessed 20.08.2022)

Fletcher J (2020) Pressure ulcer education 8: giving information to patients. Nurs Times 116(5): 31–33. https://tinyurl.com/mr2mxvfs (accessed 20.08.2022)

Gefen A, Soppi E (2020) The pathophysiological links between pressure ulcers and pain and the role of the support surface in mitigating both *Wounds International* 11(4): 38–44. https://tinyurl.com/mrswufjw (accessed 20.08.2022)

McCoulough S (2016) Adapting a SSKIN bundle for carers to aid identification of pressure damage and ulcer risks in the community. *Br J Community Nurs* Suppl: S19–25. https://doi.org/10.12968/bjcn.2016.21.sup6.s19

Lustig M, Gefen A (2022) Computational studies of the biomechanical efficacy of a minimum tissue deformation mattress in protecting from sacral pressure ulcers in a supine position. *Int Wound J* 19(5):1111–20. https://doi.org/10.1111/iwj.13707

National Health Service England (2021) Personalised care and support planning. https://tinyurl.com/4bbpa5su (accessed 20.08.2022)

Nixon J, Brown S, Smith IL et al (2019) Comparing alternating pressure mattresses and high-specification foam mattresses to prevent pressure ulcers in high-risk patients: the PRESSURE 2 RCT. *Health Technol Assess* 23(52):1–176. https://doi.org/10.3310/hta23520

Thompson G, Bevins J, Hutchcox S, White R (2008) Examining the Carital Optima air float mattress through patient experience and pressure mapping. *Wounds UK* 4(3): 72–82. https://tinyurl.com/bd545wjd (accessed 20.08.2022)