Exploring and understanding challenges in clinical practice: appropriate dressing wear time

KEY WORDS
- Audit
- Dressing
- Exudate
- Interviews
- Pain
- Wear time

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Objective: Dressings are an imperative aspect of wound management, yet dressing-associated complications can delay healing progression, causing unnecessary distress to the patient. Evidence suggests that optimal dressing choice and avoidance of unnecessary dressing changes are essential to enable undisturbed healing and minimise the ingress of harmful microorganisms to the wound site. However, frequent removal of dressings is still evident in practice, resulting in a negative patient experience and delayed healing. This study aimed to understand the experiences, key factors and current practices that determine foam dressing wear time in patients living with a wound in the community setting. **Methods:** The study was based on a mixed-methods design. A retrospective audit was undertaken to establish reasons for renewal of foam dressings on patients with acute/chronic wounds. Semi-structured qualitative interviews were also conducted with registered tissue viability nurses (n=12) working in the community setting. **Results:** The majority of wounds identified in the audit were treated with the same product family throughout the data collection period. Reasons for changing dressings were related to the need to inspect the wound or because of adherence to care plans, rather than being associated specifically with dressing performance. Practicalities, ritualistic practice and time pressures and demands were also key factors influencing a dressing change. **Conclusion:** Fundamental changes in staff attitudes and beliefs about dressing wear time are essential to optimising dressing performance and increasing patient quality of care. Enabling flexible community services that are reflective of the needs of the service are central to changing practice and increasing dressing wear time in the community setting.

The impact of living with a wound is multifactorial and hard-to-heal wounds — those that fail to heal with standard therapy in an orderly and timely manner (Troxler et al, 2006) — are associated with a range of morbidities. These wounds and their associated complications can have a significant effect on a patient's quality of life [QoL] (International Consensus, 2012; Gould et al, 2015) and ineffective wound assessment and management can exacerbate this negative impact (Tickle, 2016). Treatment strategies should be optimised not only to effectively manage the wound, but also to avoid further complications. Frequently reported patient issues associated with hard-to-heal wounds include discomfort, pain, malodour, leakage and restriction of daily activities (International Consensus, 2012).

Whilst dressings are an essential part of wound management, dressing-associated complications can hinder healing progression and cause unnecessary distress to the patient (Vowden, 2011). Potential disturbances to the wound can occur as a result of suboptimal dressing choice. There are many potential ways in which a dressing — in close contact with the wound bed and surrounding skin — can damage or disturb the wound. These include: sub-optimal moisture balance, adherence, mechanical stress, presence of foreign bodies, sub-optimal temperature, chemical imbalance, and chemical stress (Rippon et al, 2012). Repeated application and removal of dressings that adhere to the wound bed can

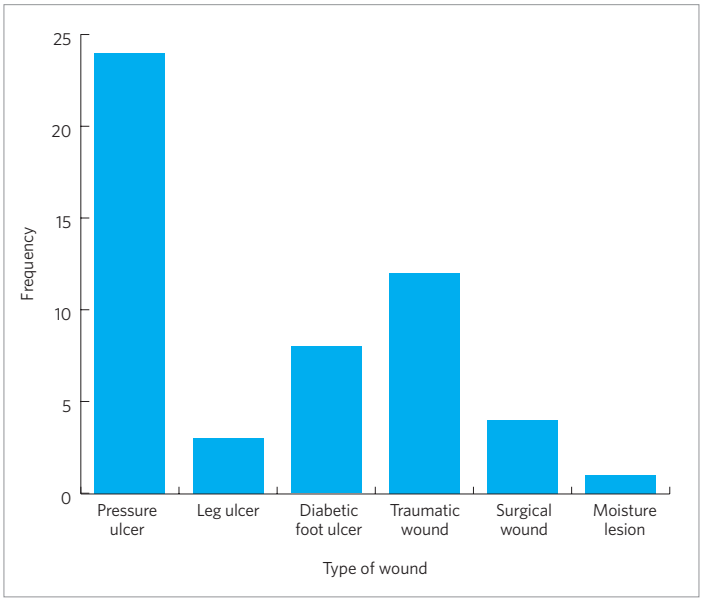

Figure 1. Summary of audited wound types

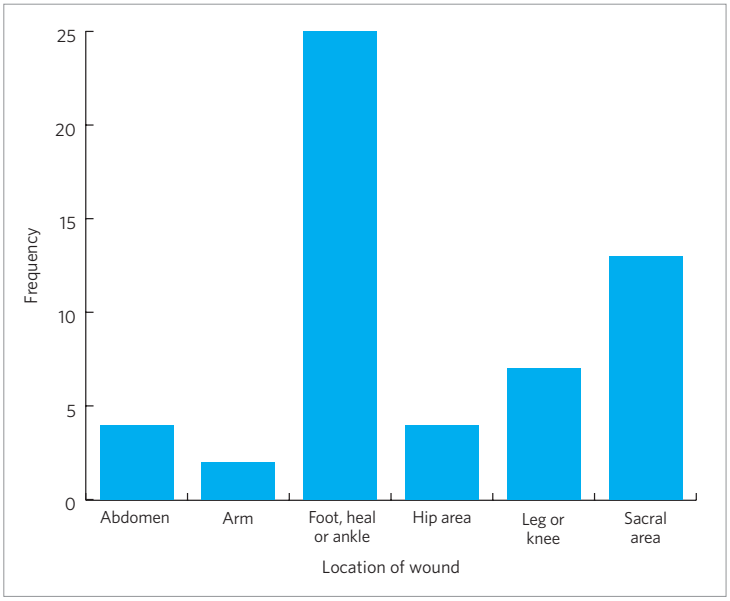

Figure 2. Summary of audited wound locations

cause epidermal stripping (Principles of Best Practice, 2004) and damage the fragile wound or surrounding skin. In addition, it can cause considerable suffering to the patient (Rippon et al, 2012). Ultimately, this trauma can lead to an increase in wound size, exacerbate pain and delay healing (Meaume et al, 2003).

Whilst optimal dressing choice is important in achieving good healing progression, it is also important to minimise the frequency of dressing changes to enable healing to occur undisturbed (Rippon et al, 2015). Frequent removal and reapplication of dressings may delay wound healing through mechanical disturbance to the healing process, temperature loss at the wound site (affecting the cellular healing process) and potential increase in the ingress of harmful bacteria to the wound site (Rippon et al, 2015). Wound healing may be further hindered as a result of psychological stress and pain during dressing changes (Rippon et al, 2015). Despite the research and evidence to support the concept of leaving dressings in place, there remains a tendency for staff to remove dressings unnecessarily.

The paper presents the results of a mixed methods study using retrospective audit collection and semi-structured qualitative interviews with tissue viability nurses.

AIMS

The aims of the study were: (i) to identify the key factors involved in foam dressing wear time in patients living with a wound (i.e. current practices and dressing use) in the community setting; and (ii) to examine the understanding, experiences and current practices of wound care in relation to the frequency of dressing change.

METHODS

A retrospective audit was undertaken to establish the reasons for renewal of foam dressings on patients with acute/chronic wounds. The audit was conducted on patients living in the community within a NHS Trust in the north of England. Patients who had been prescribed foam dressings for wound management were identified via the electronic patient record database — SystmOne (TPP). The individual patient records, which included community nursing records, were then integrated and baseline details relating to the patient (including gender, age) and the wound (including type, anatomical location, size and duration) were identified via SystmOne. Additionally, information relating to current dressing use, dressing performance and reasons for dressing renewal was captured.

Semi-structured qualitative interviews were conducted over a 1-month period during May

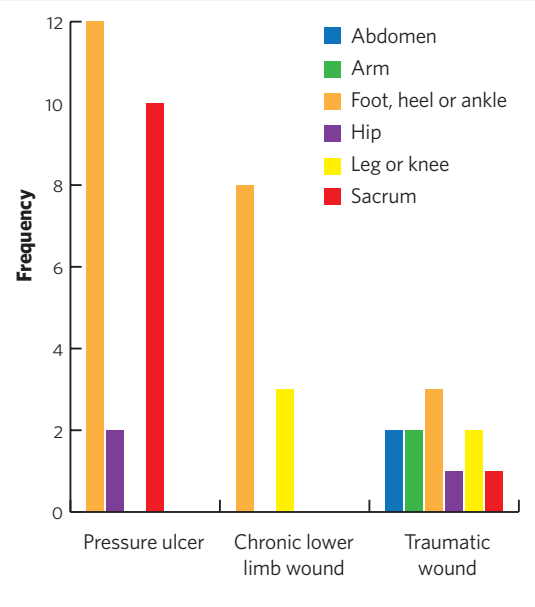

Figure 3. Summary of anatomical locations of key audited wound types

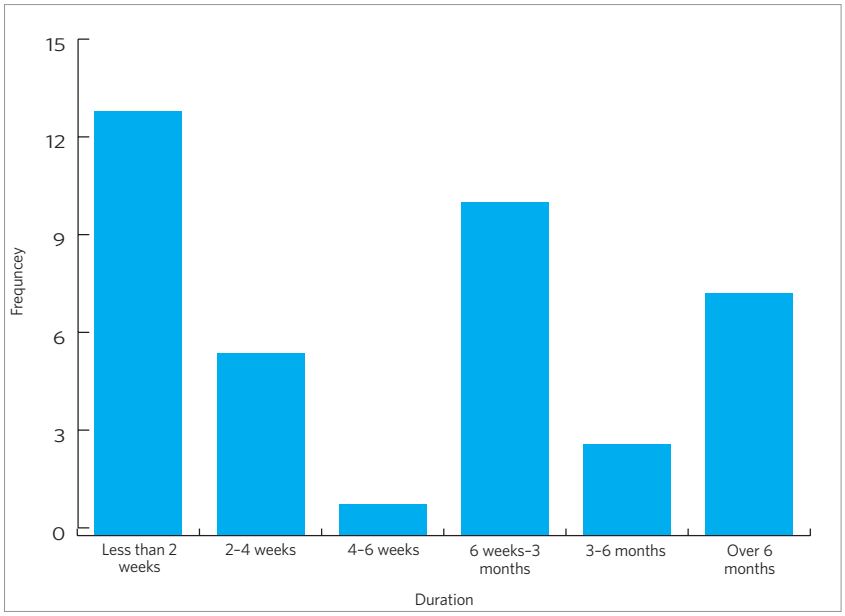

Figure 4. Summary of anatomical locations of key audited wound typess

2018. The sample consisted of registered tissue viability nurses (n=12) working in the acute and community setting. Participants were provided with information sheets and consent forms to sign prior to the interview taking place. All participants were informed that they had the right to withdraw at any time up to the point of interview analysis. All interviews were conducted via telephone and recorded. Interview recordings were transferred to an encrypted storage device and identified with a code. All recordings were transcribed verbatim and then the audio recordings destroyed. Transcripts were anonymised to remove any information that might have identified the respondents. Transcripts were entered into NVIVO qualitative data analysis software (QSR International) to aid data management analysis and retrieval.

Research governance approval was received from the NHS Trust to undertake the retrospective audit and School Research and Ethical Approval was received from the University of Huddersfield (SREP/2018/030) to undertake the qualitative interviews.

RESULTS

Baseline patient and wound characteristics.

Data from a total of 40 patients (55 wounds) were included in the audit. The mean patient age was 73.1 years (SD 15.9 years; range 39 to 101 years); 28 patients were male (51.9%); 26 patients were female (48.1%). The gender of one patient was not recorded.

The type of wound was recorded for 52 of the 55 wounds: 24 were pressure ulcers; 3 were leg ulcers; 8 were diabetic foot ulcers; 12 were traumatic wounds; 4 were surgical wounds and 1 was a moisture lesion *(Figure 1)*.

The anatomical location of all 55 wounds was recorded. About half of all wounds were located on the foot, heel or ankle, including all diabetic foot ulcers. Pressure ulcers were located mainly on the sacrum; traumatic wounds were located on the arms, legs or abdomen *(Figure 2)*.

The location of the three most common wound types (pressure ulcer, traumatic wounds, and diabetic foot ulcers) were also recorded. These wound types are referred to hereafter for brevity as the key wound types. Frequencies of remaining wound types were too low to facilitate individual investigation: however, for the purposes of this analysis, leg ulcers were combined with diabetic foot ulcers into a single category: chronic lower limb wound *(Figure 3)*.

The duration (age) of 43 wounds was recorded. About half of these wounds were of less than 4 weeks' duration; with about three quarters being less than 3 months' duration *(Figure 4)*.

The distribution of wound durations for the three key wound types was also reported. The majority of

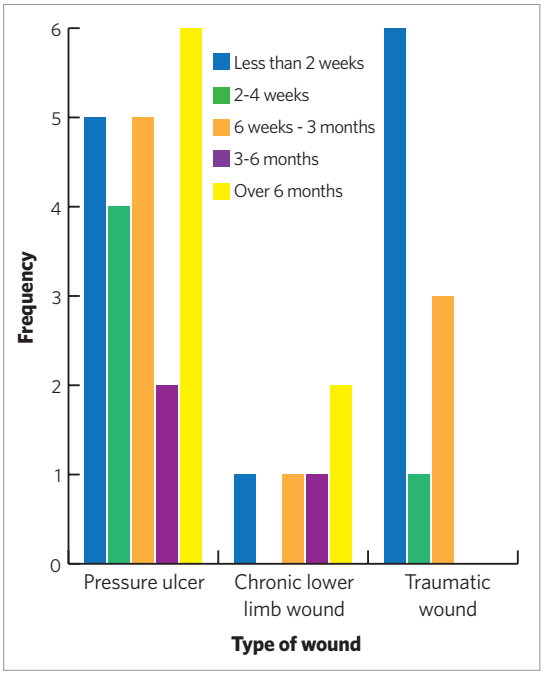

Figure 5. Summary of ages of key audited wound types

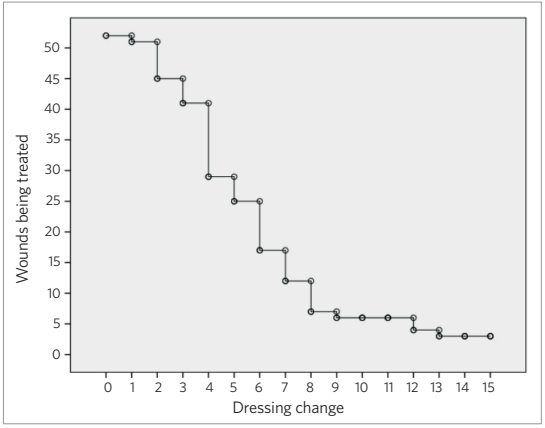

Figure 6. Pattern of wounds remaining under treatment

Table 1. Summary of wound surface areas of audited wound type

Type of wound	Wound surface area in cm^2 (Mean (SD))	Number of wounds
Pressure ulcer	5.70 (16.0)	23
Leg ulcer	10.00 (1.73)	3
Diabetic foot ulcer	1.26 (1.38)	8
Traumatic wound	19.4 (38.4)	12
Surgical wound	24.3 (31.1)	4
Valid Total	**10.0 (23.8)**	**50**
None recorded	–	5
Total	–	**55**

long duration wounds (over 6 months) were pressure ulcers *(Figure 5)*.

Dimensions (length and width) were recorded for 50 wounds; from which the approximate wound surface area was calculated (mean length x mean width). Mean surface area was 9.83 cm^2 (SD 23.1 cm^2). Calculated surface areas ranged from 0.04 cm^2 to 136 cm^2. The largest wounds were surgical wounds (mean surface area 24.3 cm^2 (SD 31.1 cm^2); the smallest were diabetic foot ulcers (mean surface area 1.26 cm^2 (SD 1.38 cm^2). Mean dimensions of all wound types are summarised in *Table 1*).

Baseline wound dressing usage

Three main varieties of foam dressings were used during the initial recorded treatment: Allevyn (adhesive or gentle border; Smith & Nephew); Aquacel (foam or adhesive border; Smith and Nephew) and Mepilex Border (Mölnlycke). Nine wounds were treated with Allevyn products (including 5 traumatic wounds, 3 pressure ulcers and 1 surgical wound); 22 wounds were treated with Aquacel products (including 11 pressure ulcers, and smaller numbers of other wound types); 20 wounds were treated with Mepilex Border (including 10 pressure ulcers, 4 diabetic foot ulcers, 5 traumatic wounds and 1 surgical wound). The single moisture lesion was treated with a mixture of honey, Allevyn adhesive and Aquacel extra products.

There was a tendency for Mepilex products to be applied to larger wounds: the mean wound surface area of wounds treated with Mepilex products was 14.4 cm^2 (SD 34.3 cm^2); compared to 4.80 cm^2 (SD 5.60 cm^2) for wounds treated with Allevyn products and 8.25 cm^2 (SD 16.2 cm^2) for wounds treated with Aquacel products. This partially reflects the different types of wounds treated with different products; with higher proportions of surgical wounds treated with Allevyn or Mepilex products; one outlying wound of unusually large surface area (136 cm^2) was treated using Mepilex.

Dressing changes — general pattern

Up to 15 dressing changes per wound were recorded during the audit period. However, the majority of wounds had 6 or fewer dressings applied; and only 6 wounds had 9 or more dressings applied. The proportion of wounds being dressed fell most sharply after the 4th dressing change as revealed in *Figure 6*, which illustrates the decreasing proportion of wounds continuing to receive treatment over time.

Analysis of the key wound types revealed that the proportion of pressure ulcers receiving dressing changes fell after the 2nd and 4th dressing change but remained non-zero throughout the entire analysis period. About half of all chronic lower limb wounds were still receiving dressing changes after the 6th change; however, none were recorded as receiving more than 7 dressing changes. Traumatic wounds showed a similar pattern, with about half

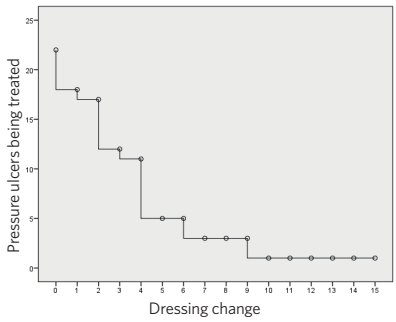

Figure 7. Pattern of pressure ulcers remaining under treatment

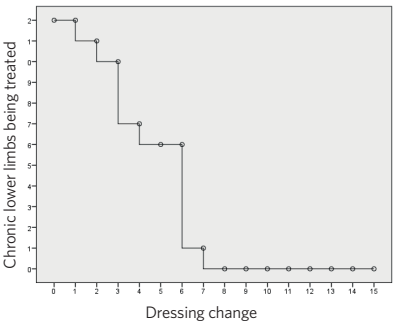

Figure 8. Pattern of chronic lower limb wounds remaining under treatment

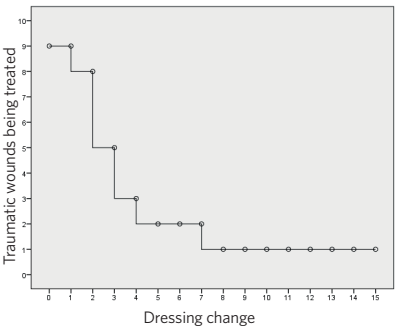

Figure 9. Pattern of traumatic wounds remaining under treatment

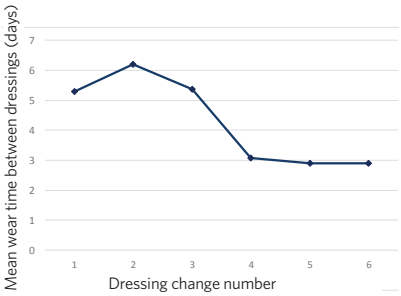

Figure 10. Mean dressing wear time between dressings (dressings 1–6)

receiving 3 or fewer changes; and only 1 wound receiving more than 7 dressing changes *(Figures 7, 8, 9)*. It may be inferred that whilst a small proportion of pressure ulcers and traumatic wounds had not healed by the curtailment of the analysis, all observed chronic lower limb wounds had healed by the time of the 7th dressing change.

REASONS FOR DRESSING CHANGES

51 wounds received an initial dressing change. Of these, the majority (about 85%) were due to a need to inspect the wound (17 wounds; 33.3%) or because of adherence to protocols (28 wounds; 54.9%).

Frequency of dressing changes

The first dressing change took place for some patients on the same day as the initial dressing placement, with all dressings being changed by 23 days. The mean wear time for the first dressing was 5.29 days (SD 4.68 days). The 2nd and 3rd dressing changes took place up to 17 days after the previous change, with similar wear times.

Some of the infrequent dressing changes may have occurred due to, for example, patients in the community not being available to have their dressings changed, and can be considered to be outlying values. If the patient whose dressing was not changed initially for 23 days is removed from the data set, the mean wear time of the first dressing is reduced from 5.29 days to 4.89 days. A further 3 patients also had dressing wear times of 14 days or more: deletion of these patients from the data set results in a mean wear time of 4.45 days. Removal of the 4 patients whose subsequent dressing changes occurred 2 weeks or longer after the previous dressing change also reduces mean wear time for the second dressing from 6.20 to 5.19 days; and reduces mean wear time for the third dressing from 5.36 days to 4.96 days. Beyond this point, the effect of outliers is reduced as there are no further wear times in excess of 10 days recorded between any two dressing changes.

As wounds healed, subsequent dressing changes were conducted on an increasingly small minority of patients with wounds remaining unhealed. Consequently, the frequency of dressing change, based on a sample with increasingly large proportion of serious wounds increased. The 4th dressing change took place between 1 day and 11 days after the previous dressing was changed, with a mean wear time for the second dressing of 4.00 days (SD 3.07 days); the 5th dressing change took place between 1 day and 10 days after the previous dressing was changed, with a mean wear time for the second dressing of 3.58 days (SD 2.89 days); the 6th dressing change took place between 1 day and 5 days after the previous dressing was changed, with a mean wear time for the second dressing of 2.91 days (SD 1.24 days) *(Figure 10)*.

Hence the general pattern observed is of relatively low frequencies of dressing changes up to dressing change number 3; with the frequency of change reaching a settled value of about 3 days from dressing change number 4 to dressing change number 6. Beyond this point the number of wounds which were still being treated was too small to calculate meaningful summary statistics.

A corresponding calculation was conducted for each of the key wound types. Differences in the pattern of dressing wear time can be observed between the different types of wounds. Mean wear time for pressure ulcers fell gradually after the 2nd dressing change (i.e. dressing changes became more frequent), and was generally lower (representing more frequent dressing changes) than for other types of wounds. Mean wear time for chronic lower limb wounds remained reasonably constant throughout the analysis period. Mean wear time for traumatic wounds peaked at the 3rd dressing change: hence these wounds were initially less frequently dressed; then more frequently; then less frequently. However, mean times calculated from individual wound types are in some cases based on very low frequencies.

Products used in dressing changes

The majority of wounds were treated with the same product family throughout the period of the audit. A small number of product changes were recorded; including the introduction of

Tegaderm, which had not featured in the initial dressing selection. Wound dressing changes are recorded in *Table 2* below. In some cases, changes to the product family were recorded on two or more occasion: in these cases, the dominant dressing used is recorded. The majority of changes of dressing produce occurred within the first 3 dressing changes, reflecting the larger number of wounds subject to lower numbers of dressing changes only.

Skin condition

Skin condition was recorded only in a minority of cases. It was mainly recorded as "irritated" in the few cases where it was recorded. It is likely that cases of no recording correspond to intact or healthy skin.

Exudate

Exudate level was recorded as none, or not recorded, in the majority of wounds. A small fraction of wounds were recorded to have medium or high levels of exudate during early dressing changes, with a negligible fraction thereafter.

Wound bed characteristics

The mean percentage of the wound bed that was observed to be granulating, sloughy or necrotic was recorded at each dressing change *(Table 3)*.

No clear pattern of granulation was observed, with mean percentages oscillating between about 25% and 0% throughout the sequence of observations. The highest values were observed during later dressing changes. The percentage of the wound bed considered to be necrotic was negligible until after the 9th dressing change, with higher values (maximum about 14%) again being observed during later dressing changes.

The maximum percentage of the wound bed considered to be granulating, sloughy or necrotic was at the 12th dressing change, with mean percentages of 25% granulating, 15% sloughy and 10% necrotic. However, due to the increasingly lower numbers of wounds receiving later numbers of dressing changes, estimates derived from this area of the graph will be subject to more uncertainty than estimated derived from earlier dressing changes.

Skin condition, exudate and wound bed characteristics were not recorded for any wounds treated with Allevyn products. Some tendency was observed for Aquacel products to be used on granulating wounds: three such wounds were assessed to be 100% granulating. However, the majority of wounds treated with Aquacel did not have any wound bed characteristics recorded. Two wounds treated with Aquacel had low or medium exudate recorded during early wound dressing procedures.

Mepilex products were initially used on wounds with either a high percentage of granulating wound bed (5 wounds with 50% or more granulation) or sloughy (3 wounds with 50% or more slough). As for other wound products, recording of wound bed condition was very limited, especially after the first few dressing changes.

INTERVIEW DATA AND DISCUSSION

When asked about why a dressing would be changed participants reported that they would remove for wound inspection and if wound debridement were required. Other reasons included loss of adhesion, dressing saturation, patient non-concordance and leakage; but none were stated in more than 2 cases.

"It's down to clinical assessment, so you obviously have the wear time that whatever dressing you've chosen, it tells you it can stay on for however long, but we normally do it on clinical assessment'
'So if the patient is a risky patient, I would change the dressing daily, if I wanted to see it."

Reasons for dressing change were recorded more infrequently the more often the dressing was changed with little detail given apart from 'dressing changed'. The primary reasons for change continued to be wound inspection and adherence to protocol. On the second dressing change, a reason for change was stated in 35 out of 45 cases; with adherence to protocols again the most common reason (24 wounds; 68.6%); followed by need to inspect the wound (8 wounds; 22.9%). The remaining 3 wounds were dressed because of loss of adhesion. The total number of wounds dressed gradually decreased over time with the number of wounds changed for loss of adhesion, dressing saturation, soilage, maceration, patient demand,

Table 2. Changes to dressing product during audit period				
Initial dressing	**Main dressing subsequently used**			
	Allevyn	Aquacel	Mepilex	Tegaderm
Allevyn	8 (no change)	0	1	0
Aquacel	2	17 (no change)	1	2
Mepilex	1	1	18 (no change)	0

Table 3. Proportions of wound bed in granulating, sloughy or necrotic state at each dressing change			
Dressing change	**Mean percentage of wound bed in stated condition**		
	Granulating	**Sloughy**	**Necrotic**
1	16.67	10.20	0.39
2	11.82	6.36	1.78
3	18.59	5.61	1.10
4	8.62	1.79	0.00
5	2.40	0.00	0.00
6	7.69	0.00	0.00
7	9.00	0.00	0.00
8	0.00	0.00	0.00
9	11.67	0.00	0.00
10	0.00	5.71	13.33
11	3.33	26.67	3.33
12	25.00	15.00	10.00
13	16.67	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00

patient non-concordance, leakage, allergy or other reason was negligible throughout the duration of the audit.

The management of patients with chronic wounds is known to provide significant burden to NHS services (Guest et al, 2017; Gray et al, 2018). This small retrospective audit, supported by qualitative interview data, highlighted that the majority of reasons for changing a patient's dressing is related to the need to inspect the wound or because of adherence to care plans, rather than being related specifically to dressing performance. This was supported through the findings of the qualitative interview data, which suggested that a clinical assessment of the patient's wound was not central in guiding decisions about changing a patient's dressing and that many staff focused on protocol without clinically assessing the wound on every visit.

"...if the care plan says three times a week, then they get that dressing changed three times a week, even the nurse would be encouraged from the training that we are to do a clinical assessment of that wound or the area of the patient's body to see actually does this need changing or can it, can, you know, the wear time be extended."

The retrospective audit found that the majority of chronic wounds are located on the lower limb and all required frequent dressing changes. Exudate levels, strike through and wanting to see the wound healing process were all provided by staff as reasons for influencing dressing changes and this was also evident in the retrospective audit data findings.

"Well first and foremost I look at strike through, so I'll look at whether there is any strike through the dressing and also what sort of condition it's looking like on the patient."

"So we tend to obviously [change the dressing] if the wound, if the wound is leaking and obviously there's quite a lot of exudate and the skin surround is macerated."

Despite dressing manufactures producing dressings which have been designed to increase wear time, these advantages are not being realised by NHS services due to the ritualistic behaviours of clinical staff. The qualitative interviews demonstrated how some staff felt that the practicalities of the community nurses visit and time pressures and demands were key factors influencing a dressing change.

"In the community, those periods get stretched, so there are less reasons that you would take it off every day. But there are different reasons why you would change it not at the right time and that again is about when you can visit the patient."

CONFLICT OF INTEREST

This project was funded through a research grant from Mölnlycke Health Care. The company had no input into the design, data collection or analysis.

Many staff felt that dressing changes were commonly determined by the nurse's visit to the patient and that although many of the dressing changes could be performed less frequently, it was more practical and pragmatic to change a dressing during their patient visit.

"If the wear time can only be extended by a day and the Nurse is already there, then they might as well change that dressing there and then rather than come out and do another visit the following day."

"...it will cost more money and more time, especially for the District Nurse's visit, to go back again and leave it an extra day. So where that they change it even if it doesn't need changing while they're there."

Within the clinical records, where was little documentation about the dressing performance, meaning that true evaluation of the dressing's ability to adhere, control the exudate and prevent maceration is impossible using retrospective data.

LIMITATIONS

This was a relatively small study that collected retrospective data and interviewed a small sample (n=12) of clinicians. However, it does provide useful information for a prospective larger audit that could provide solutions for reducing unnecessary dressing change and thus reducing nursing visits and dressing use.

CONCLUSION

The challenge to community services is how the potential of increased dressing wear time can be realised as this will require fundamental changes in attitudes and beliefs among clinicans. We suggest that more research is carried out to explore if community services would benefit from greater flexibility to accommodate best dressing choice and optimal dressing changes (overcoming barriers such as ritualistic practice and time pressures). WUK

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