Efficiency in wound care:

The impact of introducing a new foam dressing in community practice

ABSTRACT

An audit of resource use was undertaken in 35 patients treated by two ambulatory wound care providers in Germany (one medical practice and one outpatient wound clinic). A new wound dressing[i] was introduced with appropriate education and training in its use, and the frequency of dressing change and types of dressings used were recorded before and after adopting the new approach. Clinicians' views on the performance of the dressing were also surveyed. After the introduction of the new wound dressing into routine community wound care practice, the mean frequency of dressing change was reduced by 1.3 times per week, from 4.6 to 3.3 times per week. The complexity and number of different dressing products decreased. The cost of dressings per change increased slightly, but the average cost of dressings per week was reduced by approximately 23%. Clinicians' feedback on the new product was positive, with the overall performance rated as better than previous products for over 90% of wounds.

INTRODUCTION

Wounds are a growing health issue in Europe, and their treatment consumes a considerable quantity of resource[1]. Surveys in the UK have reported the population prevalence of wounds to be 3 to 4 people with one or more wounds per 1000 population.[1,2], It has been estimated that there are as many as 1.0-1.4 million diabetic foot ulcers (DFUs) and 0.5-1.3 million leg ulcers at any one time in Europe, with 400,000-600,000 new DFUs per year and almost one million new venous leg ulcers (VLUs) presenting each year.[3] The economic cost of managing these wounds is considerable, representing 2-4% of the total healthcare budget.[4] As an example of the cost of treating individual wounds, the mean total cost of treating a chronic leg ulcer per year in Germany has been estimated to be over €9000.[5,6]

The demand for wound care will continue to grow because of an ageing European population and the growth of chronic long-term conditions, and as a consequence, the cost of treatment is likely to continue to rise.[7] This is against a backdrop of competing resources from other areas of healthcare and increasing pressure on healthcare funding, and therefore efficiency gains will be necessary if providers are to continue to meet demand for wound care services.

Much of the cost of wound care is driven by hospitalisation and nursing time, with materials and dressings making up a relatively small proportion.[1,2] In the medical practice and outpatients setting, most of the resource utilisation is the time of healthcare professionals required to change wound dressings and undertake other activities such as cleansing, debridement and wound assessment.[2] Hence one of the key ways to make wound care more efficient is to release some of this time. Previous studies have shown that the introduction of an advanced wound dressing combined with changes in practice can reduce unnecessary dressing changes and help to free up nurses' time.[8,9,10]

[i] ALLEVYN™ LIFE, Smith & Nephew, Hull, UK

G T Krönert[1]

H Roth[2]

R J Searle[3]

[1] Thüringen-Kliniken "Georgius Agricola" GmbH, 07318 Saalfeld/Saale.

[2] Gemeinschaftspraxis Dr. Zollmann, Engelsplatz 8, 07743 Jena.

[3] Smith & Nephew, Hull, UK.

Correspondence to: Richard.Searle@Smith-Nephew.com

Conflicts of interest: This evaluation was funded by Smith & Nephew.

One of these studies also showed a reduction in dressing costs as a result of adopting this approach.[10] The dressing used in these studies includes a change indicator that is designed to indicate when the dressing needs to be changed, and a discretion / masking layer that reduces the staining of the dressing surface with exudate.

This article describes the results of an audit of resource use undertaken by two ambulatory operating wound care providers in Germany. With regard to the treatment of chronic wounds, the relevant medical practice in Jena treats ulcus cruris patients (both venous and arterial aetiologies), secondly decubitus cases and in some cases diabetic foot cases. The practice is part of the wound network of Thuringia, which is a network of ambulatory medical practices focused on wounds, hospitals, medical suppliers, nursing services etc, enabling well-organised treatment of patients with chronic wounds. The Saalfeld centre primarily treats peripheral arterial occlusive diseases (level 4) with peripheral lesions as well as diabetic foot ulcers.

The new[ii] wound dressing[iii] was introduced with appropriate education and training in its use, and the frequency of dressing change and types of dressings used were recorded before and after adopting the new approach. Clinicians' views on the performance of the dressing were also surveyed as part of the audit.

METHODS

Firstly, prior to the introduction of the new dressing, there was a training and education phase, during which staff were made aware of the new dressing and trained in how to use it. Clinicians in one of the two sites had previously been aware of the dressing, whereas in the other they were not. Particular attention was paid to making use of the exudate masking and visual indicators, which help patients and clinicians to recognise the most appropriate time to change the dressing.

Secondly, staff (wound care nurses and homecare providers) at the two sites used the new dressing routinely in their practice for suitable patients with chronic wounds, based on the product's indications for use. These decisions were based on clinical judgment and clinicians were able to modify their practice where appropriate (particularly dressing change frequency) to make use of the features of the new dressing. Anonymised data were collected using a paper audit form for each wound where the dressing was used, for a maximum of four dressing changes during January 2015 to April 2015. The data collected included details of wound characteristics, information about the dressings that were used and clinicians' feedback on the performance of the new dressing. Wear times were recorded for previous dressings and for the new dressing (the latter being recorded for four dressing changes). These values were converted to frequency of dressing change for each wound using the equation: frequency (per week) = 7 / wear time (days). Dressing change frequency data were analysed on a per-patient basis, i.e. the frequency was first calculated for each patient and then the mean value was calculated across the group of patients. Wound area at the start of the evaluation was estimated from the maximum length and width of each wound using an ellipse formula.[iv,11] Tables of results were prepared using SPSS™ v19.0.

German national pharmacy prices were used to calculate the cost per dressing change and cost per week of the dressings that were used. In order to estimate costs where generic or non-specific dressing types were recorded, assumptions were made about which products were used. Details of dressing sizes were only recorded for the new dressing, so for previous dressings the nearest size which matched the size of the new dressing was assumed. In some cases, the secondary dressing or fixation was not recorded. In these cases, as a conservative approach, we did not assume any secondary dressing costs.

RESULTS

35 patients with wounds who were being treated in the two different wound care providers in Germany (referred to above) were included in the audit. 34 patients had one wound and one patient had two wounds. For this latter patient, data relating to the larger of the two wounds were included. Therefore, in total, data from 35 wounds were included in the analysis.

DEMOGRAPHICS AND WOUND CHARACTERISTICS

Around three-quarters of patients were more than 60 years old, the most common age range being 71-80 years (Table 1).

TABLE 1: PATIENT AGE

Age category (years)	Number of patients	Percentage of patients
31-40	1	2.9%
41-50	0	0.0%
51-60	8	22.9%
61-70	5	14.3%
71-80	13	37.1%
81-90	8	22.9%
Total	35	100%

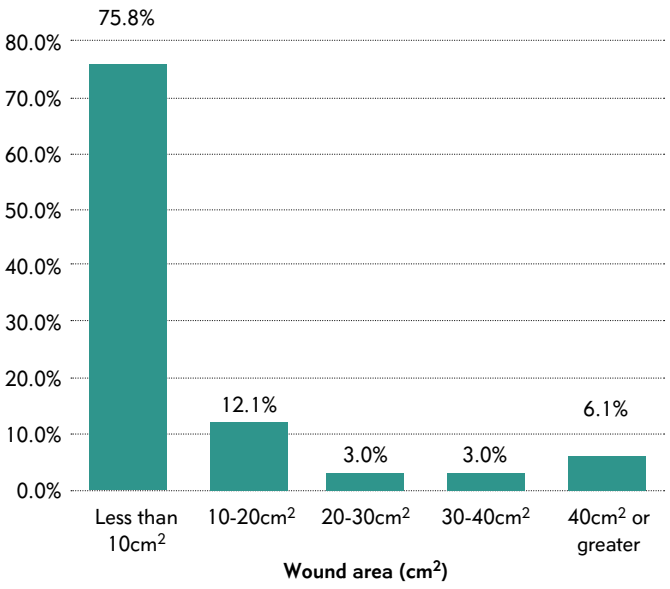
*Percentages may not add up to 100% due to rounding

[ii] The term 'new dressing' refers to the newly-introduced dressing.
[iii] ALLEVYN LIFE, Smith & Nephew, Hull, UK
[iv] Area = length x width x π/4.

Of the 35 wounds included in the audit, 20.0% (7/35) were diabetic foot ulcers (DFUs), 31.4% (11/35) were venous leg ulcers (VLUs), 28.6% (10/35) were pressure ulcers and the remaining 20.0% (7/35) were other wound types. Nine of the ten pressure ulcers were Category 2 ulcers and one was a Category 3 ulcer. Of the seven DFUs, one was classified as a Stage 1 DFU, four were classified as Stage 2 and two were "malum perforans" ulcers.

Wound area was calculated for 33 wounds where length and width were available. Of these wounds, more than 75% of the wounds had a wound area of less than 10cm^2, with only 6.1% (2/33 wounds) having an area of more than 40cm^2 (Figure 1).

FIGURE 1: WOUND AREA



The most common exudate level was Moderate (15/34 wounds, 44.1%), with 10 wounds recorded as Low (29.4%), 1 wound Moderate to high (2.9%) and 8 wounds with a high level of exudate (23.5%). Of the 33 wounds where the type of exudate was recorded, 23 (69.7%) were recorded as having Fluid exudate, and 10 (30.3%) had Viscous exudate. Respondents were also asked to record the condition of the wound bed at the start of the evaluation. These categories were not mutually exclusive and therefore selection of more than one category was permitted. 45.7% of wounds (16/35) were epithelialised, 68.6% (24/35) had granulation tissue present, 5.7% (2/35) had necrotic tissue and 68.6% (24/35) had slough. The condition of the surrounding skin at the start of the evaluation was recorded (again with multiple selection permitted). 48.6% (17/35) had healthy skin, 31.4% (11/35) had reddened skin, 5.7% (2/35) had moist skin and 8.6% (3/35) had dry skin.

DRESSING PRACTICE

3 of the 35 wounds were newly-presenting and therefore had no previous dressing use. For the remaining 32 wounds, the previous dressing products used prior to the introduction of the new dressing were recorded. Four of these wounds had multiple products used, whereas 28 wounds had a single product used. Where there was a previous product used, 65.6% (21/32) of these wounds had been treated with a foam dressing.

Other dressings used pre-implementation included alginates, hydrocolloids and absorbent dressings (Table 2). After the changes, the new dressing was used on all 35 wounds. In some cases, other products were used in conjunction with the new dressing (Table 3).

TABLE 2: DRESSING PRODUCTS USED: PRE-IMPLEMENTATION

Dressing 1	Dressing 2	Number of wounds	Percentage of wounds*
Foam		21	65.6%
Hydrocolloid		3	9.4%
Alginate		2	6.3%
Absorbent dressing		1	3.1%
Gelling fibre dressing	Absorbent dressing	1	3.1%
Foam	Alginate	1	3.1%
Foam	Hydrogel	1	3.1%
Foam	Irrigation	1	3.1%
Silver-containing gelling fibre dressing		1	3.1%
Total		32	100.0%

*Percentages may not add to 100% due to rounding

TABLE 3: DRESSINGS USED: POST-IMPLEMENTATION

Dressings	Number of wounds	Percentage of wounds**
New dressing with no additional dressings	26*	74.3%
New dressing + hydrogel	5	14.3%
New dressing + alginate	2	5.7%
New dressing + silver-containing gelling fibre dressing	2	5.7%
Total	35	100%

* 18 recorded no additional dressing, 8 where additional dressing was blank.
**Percentages may not sum to 100% due to rounding.

In the post-implementation phase, the most commonly-used size of the new dressing was 10.3 x 10.3cm (used on 62.9% of wounds, 22/35), followed by 12.9 x 12.9cm (14.3%, 5/35) and 15.4 x 15.4cm (11.4%, 4/35). The largest size used was 21 x 21cm (1 wound), and heel or sacrum dressings were used on 3 wounds.

There were 140 dressing changes recorded. Four patients were excluded from this analysis because wear times were not available both before and after the new dressing. Table 5 shows that for these 31 patients the mean wear time increased by 0.46 days and the mean frequency of dressing change decreased by 1.25 changes per week.

TABLE 4: FREQUENCY OF DRESSING CHANGE

	Pre-implementation	Post-implementation	Difference
Mean wear times (days)	1.73	2.19	0.46
Mean frequency of dressing change (times per week)	4.59	3.34	-1.25

For 100 of the 140 dressing changes (71.4%) the reason for changing the dressing was reported (from one provider only). The most common reason for dressing change (90.0% of changes, 90/100) was that the dressing was 75% saturated. This relates to the structure of the new dressing, which has four lobes that provide a visual indication of when to change the dressing. When three of the four lobes show exudate, a dressing change is required. For the remaining 10% of dressing changes, the reason was "Routine issues".

FEEDBACK FROM CLINICIANS ON THE PERFORMANCE OF THE NEW DRESSING

As part of the evaluation clinicians were asked (for each wound included) "Would you recommend the new dressing for this kind of indication?" Responses were recorded for 82.9% of wounds (29/35), and of these, 27 (93.1%) replied that they would recommend the new dressing. Further feedback on how the dressing affected wound characteristics during its use is shown in Table 5. Feedback on the performance of the new dressing compared with previous dressings for ease of use, adhesion, wear time and overall performance is shown in Table 6.

TABLE 5: CLINICIAN FEEDBACK ON PRODUCT PERFORMANCE – WOUND CHARACTERISTICS

Wound characteristic	Number of wounds Decreased*	Same*	Increased*
Wound size	26 (81.3%)	6 (18.8%)	
Exudate level	24 (75.0%)	7 (21.9%)	1 (3.1%)
Odour	21 (67.7%)	10 (32.3%)	
Pain	21 (67.7%)	10 (32.3%)	

*Percentages may not sum to 100% due to rounding

TABLE 6: CLINICIAN FEEDBACK ON PRODUCT PERFORMANCE – COMPARED TO PREV. DRESSING

Performance	Number of wounds Better*	Same*
Ease of use	30 (96.8%)	1 (3.2%)
Adhesion	28 (90.3%)	3 (9.7%)
Wear time	28 (90.3%)	3 (9.7%)
Overall performance	30 (96.8%)	1 (3.2%)

*Percentages may not sum to 100% due to rounding

DRESSING COSTS

Table 7 shows the estimated dressing costs for the 31 wounds where frequency of dressing change was available before and after the introduction of the new dressing. A 2.1% increase in the mean cost of dressings per change was observed, whereas the cost per week decreased by 22.6% after the introduction of the new dressing.

TABLE 7: ESTIMATED DRESSING COSTS

Mean cost of dressings per wound	per dressing change	per week
Pre-implementation	€10.35	€45.81
Post-implementation	€10.57	€35.46
Reduction	-€0.22	€10.35
% reduction	-2.1%	22.6%

DISCUSSION

The age of patients and type of wound included in this audit are typical of those wounds encountered in routine practice in community healthcare.[12] The majority of people living with wounds are in the older age groups, and other published surveys have shown that these patients often have underlying long-term conditions such as diabetes and cardiovascular disease.[4] Wounds are often relatively small in surface area,[12] and this is borne out by the results presented here. Further, wounds often produce exudate, the management of which is an important element of good

TABLE 8: AGGREGATED DRESSING CHANGE FREQUENCY RESULTS FROM FOUR EVALUATIONS

Evaluation	Frequency of dressing change (per week)			Number of wounds
	Before introduction	After introduction	Difference	
Simon et al 2014[8]	2.00	1.35	0.65	97
Stephen-Haynes et al 2013[9]	4.52	2.88	1.64	28
Joy et al 2014[10]	3.60	1.80	1.80	37
This evaluation	4.59	3.34	1.25	31
Combined*	3.09	1.98	1.11	193

*Mean weighted by the number of wounds

wound care.[13] In this evaluation, the majority of wounds were moderately to highly exuding. Such wounds require dressings that are able to manage the exudate whilst providing a moist environment to aid healing, yet prevent maceration to the surrounding skin and trauma to the wound bed.[13] The wound beds of the wounds in this audit were characterised by a mixture of tissue types, including over 60% of wounds with slough, and around a third of patients had reddened skin around the wound. For this group of patients, dressings that do not cause trauma to the skin are particularly important.[14]

Often patients with chronic wounds experience isolation, social exclusion, depression and other psychosocial effects, and dressings that can help to improve wellbeing are an important component of good wound care.[15] The choice of dressings is therefore an important decision, and one that can have a profound impact on wellbeing. For wound care providers this choice may also have an impact on efficiency. Simplifying and rationalising wound care has been shown to have economic benefits,[16] and this evaluation demonstrates a simplified picture of dressing usage after the introduction of the new dressing. Specifically, there were nine generic dressing combinations (e.g. foam + alginate) before and four combinations after the change. Previous evaluations have also demonstrated a reduction in the complexity of dressing usage. For example, one real-world evaluation of 37 wounds showed a reduction from eleven different generic dressing combinations to two, an 81.8% reduction.[10] The complexity of care and the number of different dressing products has expanded markedly over the last two decades, and whilst the ability to choose may be seen as an advantage, a simpler pattern of usage may mean that efficiencies can be introduced.

Frequency of dressing change is one of the most important determinants of cost in community wound care,[1] and optimising frequency for a given patient may provide opportunities to free up resources. This evaluation demonstrated a marked reduction in frequency of change after the introduction of the new dressing. This is in line with previously published real-world evaluations in community wound care similar in methodology to the work reported here.[8,9,10] In total for these three previous reports combined, there were 186 wounds included, of which dressing change frequency information was reported for 162 (87.1% of the wounds). Combining data from this current evaluation provides a total of 221 wounds, of which 193 have dressing change frequency information both before and after the introduction of the new dressing. Table 1 shows the results of this current evaluation alongside the other previous reported projects.

The combined results of the four evaluations demonstrate a reduction in dressing change frequency of just over one visit per week across 193 wounds. The mean reduction in visits per week ranges from 0.65 (Simon et al) to 1.80 (Joy et al). As discussed in previously published work, optimising dressing change frequency in this way could potentially free up a considerable quantity of time. For example, a provider covering a population of 500,000 people is likely to be treating 1,750 patients with wounds at any one time (assuming a population prevalence of 3.5 patients with a wound per 1000 population).[1,2] Assuming that a reduction of one visit per week could be realised across this population, this could release 1,750 visits per week, or approximately 900 hours.[17] Annually this would amount to 91,000 visits or over 46,000 hours.

Two of the previous publications calculated the reduction in dressing change frequency for a subset of wounds that were previously having dressings changed 3 or more times per week, showing an even greater reduction in dressing change frequency for this group.[8,9]

Although clinical outcomes were not quantitatively assessed in this audit, clinicians' views on the performance of the new dressing were sought. The results demonstrated that over the course of several dressing changes, positive changes in the wound size, exudate level, odour and pain

were observed. These results are not comparative with a control group, and the effect of the dressing itself cannot be separated from other aspects of the care that patients received. Nevertheless, they provide an important insight into the new product from the health care professionals' perspective. Similarly, in terms of ease of use, adhesion, wear time and overall performance, clinicians reported a very positive view, with the new dressing being reported to be better than previous dressings in over 90% of wounds in each case.

LIMITATIONS

The number of patients included in the evaluation was relatively small, although when combined with results from other similar published evaluations the aggregated number of wounds included is substantial. Nevertheless, it would be beneficial to undertake further work in other localities and care settings to increase confidence in the generalisability of the results. This evaluation represents real-world data and the authors recognise that other designs such as randomised controlled trials are valuable and would be useful to complement the data presented here. Finally it should be noted that the costs reported here apply specifically to Germany.

CONCLUSIONS

After the introduction of the new wound dressing into routine community wound care practice, the average frequency of dressing change was reduced by more than one change per week and the complexity and number of different dressing products decreased. The cost of dressings per change increased slightly, but the average cost of dressings per week was reduced by approximately 23%. Clinicians' feedback on the new product was positive, with the overall performance rated as better than previous products for over 90% of wounds. ■

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