Indecent exposure: a descriptive study of wound exposure times associated with dressing changes

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Abstract

The purpose of this descriptive study was to describe the duration of wound exposure during dressing changes and to document variables such as type of dressing, aetiology, or presence of infection that may influence the time the wound was exposed during the dressing change. In particular, the study explored how wound assessment procedures influenced the exposure time of the wound.

The setting was a surgical unit of a 650 acute care bed tertiary hospital – 47 patients with open wounds were recruited; three of these were not included in data analyses as they did not undergo a wound dressing change in the clinical setting. A total of 281 dressing changes were timed for 44 participants.

Of the 281 dressing changes, exposure for an extended amount of time was documented in 126 cases. A statistically significant correlation between wound assessment by medical officers and wound exposure was demonstrated ($p<0.004$). Comparisons between aetiologies, dressing products and infectious status also demonstrated statistically significant results for length of wound exposure.

This descriptive study found that long periods of wound exposure were associated with wound dressing changes. There is no evidence as yet that wound exposure is harmful to wound healing; however, the literature states that moist, warm environments are beneficial to healing, which suggests that current practice could have detrimental effects.

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Introduction

Nurses spend a considerable amount of time on wound management; this includes assessing the patient's wounds, advising on dressing selection and performing dressing regimes. The dressing regime may occur at any time of the day depending on when it fits into the overall daily care plan for each patient.

Wounds need to be regularly assessed to evaluate the effect of various treatment approaches and nursing staff undertake this at the time of the wound dressing procedure [1, 2]. However, wound assessment is a multidisciplinary function and other health personnel may wish to assess the wound at various times throughout the day. Anecdotal evidence in this study setting suggested that wound dressings removed for wound assessment by clinicians at times other than when the nurse was undertaking a scheduled wound dressing change, were not being redressed immediately, leading to wounds being exposed for long periods of time.

The literature suggests that a wound dressing change should take the least amount of time possible to minimise changes to the local wound environment [3, 4]. Only one paper in a 'question to the editor' section was identified in the literature review that specifically focused on how long a wound could be left exposed between dressing changes. To achieve clinical effectiveness in care, the editor stated that "wounds should be only exposed for the minimum amount of time necessary for appropriate interventions to be carried out; however, no clinical studies have been performed to identify the effect of parameters that may be important in quantifying the effect of exposure on the healing response" [1].

Suggestions that optimal wound bed parameters, including moisture [1, 5-18], temperature [19-24], pH [11, 25-27] and bacteria levels [6, 18, 28, 29] are required to be within a specified range for effective healing are reported in the literature. In addition to these local wound environment parameters, other variables that may impact on the wound dressing change are patients' pain and distress [5, 30] and dressing products, which can facilitate optimal wound healing by providing moisture, thermo-regulation and protection. Dressing products also maintain pH levels and may decrease unpleasant sensations.

There is a dearth of quantifiable evidence about whether wound exposure is a problem affecting patient clinical outcomes. However, there is evidence that suggests wound exposure may impact on the healing response in relation to decreased temperature, cellular activity and increased risk of infection. Any practice that affects the local conditions could affect patient outcomes. Therefore it is reasonable to suggest that an optimal local wound environment will contribute to increasing healing rates, reducing pain, optimising the aesthetic appearance and decreasing costs of care.

Glossary

Open wound
A wound where there is no approximation of skin edges

Dressing down
The act of removing a dressing

Scheduled
A wound dressing change due to be changed that day

Exposure
Exposure of the wound to the environment beyond the amount of time required to clean the wound and change the dressing

Primary dressing
The dressing material in immediate contact with the wound bed

With the move in nursing and healthcare towards evidence-based practice, there is a need to underpin decision making with the best available evidence. Clinicians may improve the outcome of wound care by basing their practice on research findings, experience and patient preference and by identifying and correcting any factors that may impede healing [31]. If a wound is left exposed for periods longer than desirable, the provision of a moist environment at the wound/dressing interface, thermal insulation properties and impermeability to bacteria are compromised [32].

The purpose of this study was to describe the duration of wound exposure during dressing changes in order to document variables such as type of dressing, aetiology or presence of infection that may influence the time the wound was exposed during the dressing change. In particular, the study explored how wound assessment procedures influenced the exposure time of the wound to the environment.

Methods

Study design

A descriptive design was considered appropriate for this study given the lack of research in this area.

Study setting

The study setting was a 28 bed surgical unit of a large tertiary hospital in South Australia. The majority of beds (22) are allocated to the plastic and reconstructive unit and the other six are allocated to the neurosurgery unit. The unit can increase to 32 beds in times of high demand.

The unit has a high turnover of patients, with the length of stay ranging from 2 days to many months in the case of patients who have pressure ulcers or have suffered major trauma. The ward is staffed by nurses with a variety of qualifications as well as medical officers. A range of other health care professionals, including physiotherapists, dieticians, occupational therapists, and infection control staff, also visit the ward as part of the health care team.

Population and sample

A convenience sample of patients was admitted with an open wound to the clinical setting during the designated 10-week data collection period between October and December 2002.

- *Inclusion criteria:* Any adult patient with an open wound requiring a dressing change by nursing or medical staff was included in the study, provided they were able to give informed consent to participate.
- *Exclusion criteria:* Subjects were excluded if there was an adverse event during a wound dressing change (i.e. a cardiac arrest), involvement in other studies, unable or unwilling to give informed consent, or if they had a closed wound. Subjects with greater than three wounds were also excluded from the study due to the complexity of the wound care procedure.

Ethical approval was gained from the hospital ethics committee as well as the study setting.

Recruitment strategies

At the commencement of the study a list of current patients and their diagnoses was compiled. Patient records were checked to identify if the patient had a wound and if they met the inclusion criteria. If the patient met the inclusion criteria, a staff member informed them about the research and, if agreeable, the researcher organised a convenient time to approach them. At the initial contact, the purpose of the research was explained to the patient and a written information sheet provided. At this time, written consent was requested, once the patient understood the purpose of the research and had verbally agreed to be involved. Once consent had been freely given, the subject was assigned a code number to ensure anonymity of data collected.

During the study, the list of current subjects in the unit was updated daily. The researcher identified subjects scheduled to have their wound dressing changed that day and the staff member allocated to their care. Each nurse was approached and asked to contact the researcher prior to getting the dressing supplies ready. If the researcher was not already on the ward, this allowed them time to get to the ward without compromising the timings of wound dressings to be observed.

To ascertain what wound dressing changes would be performed each day and to check if any dressings were being taken down for assessment, the researcher attended the ward following handover from the night shift. The researcher carried a pager from 7.00am to 5.00pm and was then contactable from 5.00pm to 10.00pm by telephone. If a subject in the study had a wound that required changing between 10.00pm and 7.00am, it was classified as missed data unless one of the nurses assisting with data collection was working that shift.

The researcher enlisted the help of two members of the nursing staff in the clinical area to assist in the timing of wound dressing changes if the researcher was unavailable during the allocated study time period. The two nurses were trained by the researcher on how to use the data collection tool. The majority of the tool could be filled out using tick box selection. One part of the tool required the documentation of the timing of different stages within the wound dressing change using the wall clock in the subject's room. The data collection tool was piloted on a small number

of patients prior to commencement of the study. The inter-rater reliability of the two research assistants who assisted with data collection was 100%.

Data collection

There were two specific types of data collected, demographic data and data specific to each dressing episode. The data specific to each dressing episode were obtained by observation of wound dressing procedures and recorded on the data collection tool (Figure 1).

Wound exposure was defined as any length of time that the wound was without its primary dressing and not in the process of being cleansed. This was measured by documenting the start and finish times on removal and reapplication of the primary dressing. If the dressing change was being performed as one component, with only the required amount of exposure required to cleanse the wound, then the finish time of the dressing removal was the same time as for the start of the dressing reapplication. Other data recorded for each dressing episode included the reason the dressing was changed and what type of dressing was reapplied. If the dressing episode included a wound assessment phase, then data were also collected on any temporary dressing coverings applied.

Data analysis

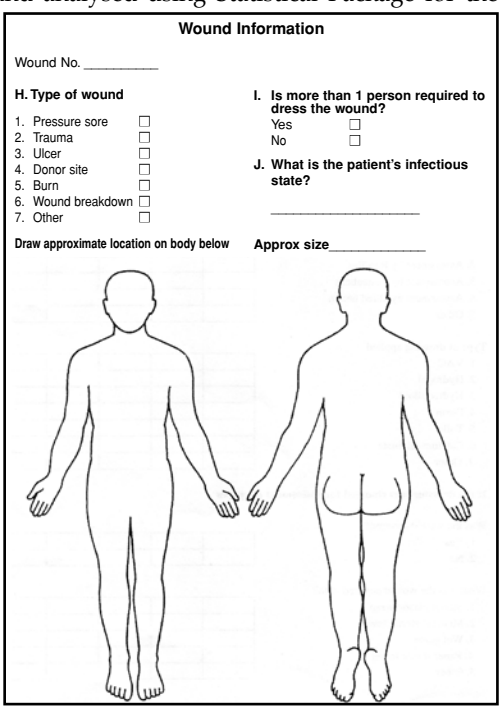
The data were collated on a handheld computer with database software FileMaker Pro® and then the information was downloaded and analysed using Statistical Package for the Social Sciences (SPSS) 10.1™. Frequency distributions were used to organise and demonstrate how the data were distributed amongst the variables for the dressing change and type of dressing applied. Standard deviations (SD) and ranges of data (such as age and exposure time) were calculated to show the distribution of data. Because a convenience sample was used, we could not be sure that the data did not violate assumptions of normality, so the Mann Whitney U test was used rather than the parametric t-test. Analysis was performed to determine if there were differences between the variables of dressing application, reason for dressing change, wound aetiology, and infection in relation to length of exposure.

Findings

Figure 2 details the number of subjects who were included; the number of dressing changes observed; the number of wounds exposed or not; and the number of exposed wounds due to wound assessment.

Demographics

The 281 wound dressing changes observed were taken from the 44 patients who constituted the study sample. The subjects' ages ranged from 15-92, with 27.3% female and 72.7% male (Figure 3). The wound aetiologies of the study sample reflect the usual types of wounds typically seen in this study setting such as pressure ulcers, ulcers, trauma, burns, wound breakdown, donor sites and wounds with other



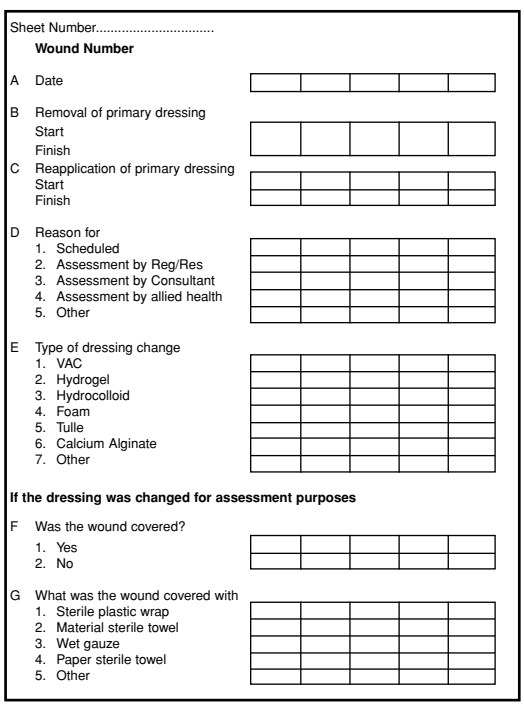


Figure 1. Data collection tool.

aetiologies (usually considered to be spider or insect bites) (Figure 4). The majority of subjects (181/281) had more than one wound (64.4%).

Descriptive data

During the 62 days of the study, 281 wound dressing changes were observed. There were five wound dressings that were missed; three due to the vacuum assisted closure (VAC) dressing not maintaining its suction, two because patients admitted with hand lacerations were also missed. These two patients were awaiting theatre and were not recruited as they would not normally have a dressing performed prior to a repair; however, theatre was delayed and they both had a dressing change later in the day without the researcher being contacted.

Exposure

Wound exposure occurred in 126/281 (44.8%) cases of this study, with a mean duration of exposure 103.17 (SD 96.70) minutes (Table 1).

Assessment

Of the 126 wound dressing changes that were exposed, 106 incorporated wound assessment (84.1%). Of these wounds, 101 were covered with a temporary dressing and five were not covered with anything. Of the wounds that did have a temporary dressing applied, 54.8% were covered with a material sterile towel. Traditionally, sterile cloths have been used in the study setting and replaced paper towels, which adhered to the wound. However, with the advances of research into the benefits of moist wound environment, the dissemination of information to the clinical area would appear to be lacking, as only 10.8% of temporary dressings applied were moist wound products.

Wound exposure contributing factors

Wounds per patient

One factor which was thought may have been contributing to the length of exposure were the number of wounds the patient had. Subjects with more than one wound comprised 65.1% of the exposed wounds (82/126), which was comparable with the total number of patients that had more than one wound (64.4%). A Mann Whitney U test was done to determine whether patients with different numbers of wounds had different exposure times; the result was not statistically significant (p=0.5).

Dressings per day

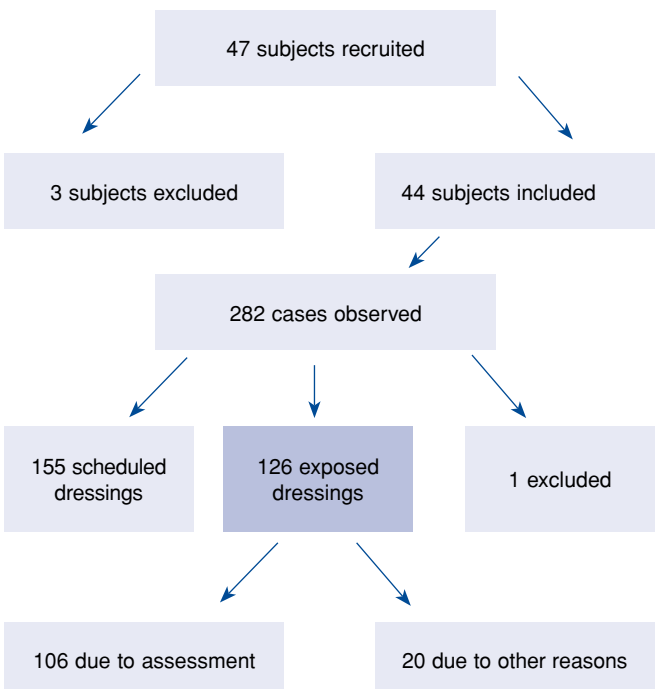
The data on the number of dressings per day in the study

setting were also analysed to determine whether the exposure times were different depending on the number of dressings to be attended. A statistically significant result was found for the days where one dressing per day was required to be undertaken, compared to those days with five dressings required to be performed (p=0.038). This indicates that wound exposure is more likely to occur when there are a greater number of wound dressings required to be changed in a single day. However, on the three occurrences when there were six dressings required to be changed in 1 day, the mean exposure time decreased, refuting this assumption.

The data were further analysed to determine whether the exposure times were different for the following:

- *Wound aetiology:* subjects with pressure ulcers had exposure times significantly longer when compared to subjects with trauma (p=0.001) and 'other' wound types (p=0.014).
- *Type of wound dressing product applied:* wounds that required a VAC dressing application were exposed for considerably longer periods of time when compared to Idosorb (p=0.032).
- *Presence of infection:* the mean exposure time for subjects who had an infection in their wounds compared to those who didn't was statistically significant at p=0.000.
- *Wound assessment by clinician other than a nurse:* subjects with a wound dressing removed for assessment purposes by the registrar/resident had a statistically significant greater length of exposure when compared to scheduled wound changes (p=0.004), and a dressing changed for 'other' reasons (such as strikethrough of wound exudate) (p=0.015).

Figure 2. Recruitment flow chart.



During the analyses it was discovered that the majority of wound care was performed between 7am and noon, with a mean exposure time of 107.39 minutes (97.19). This is compared to wounds attended to between noon and 7am where the mean exposure was 18.83 minutes (9.83) (Figure 5).

Discussion

The study sample had more males than females aged 15-44 years, and the male subjects predominantly had wounds from trauma or burns. These results support the data in the results of the 2001 National Health Survey reported by the Australian

Figure 3. Gender and age distributions of subjects.

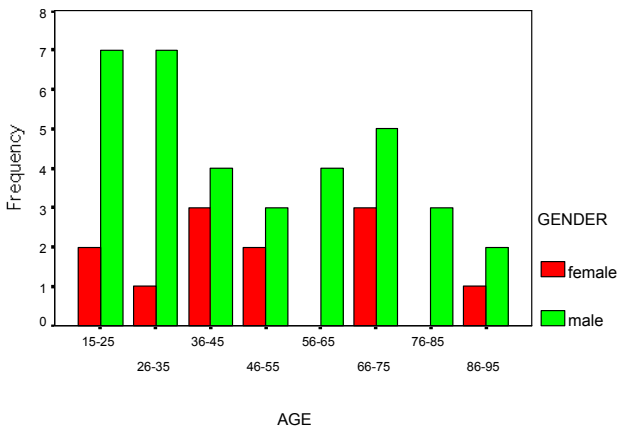
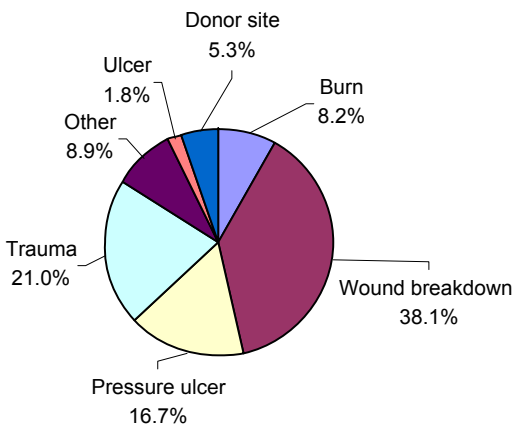


Figure 4. Wound aetiologies.



Bureau of Statistics (ABS) [33]. The other age ranges in the study sample were not admitted with any common wound aetiology except for the 76-95 year age range, which appeared to have a high prevalence of wound breakdown. The considerable evidence linking age with an increased incidence of infection and poor wound outcomes supports this [34-36].

A high percentage of wound exposure was associated with regular wound assessments by medical officers and the associated problems encountered by nurses in efficiently redressing the wounds. Specific types of wounds, dressing applications and the infectious status of the patient also impacted on the length of wound exposure. The number of wounds a patient had, and the number of dressings required to be performed in the study setting on 1 day, did not significantly impact on the exposure time of individual wounds.

During the study there were many other issues also found to impact on wound exposure (but not within the scope of the study) including the staff to patient ratio, staff-patient allocation and time management issues associated with patients activities of daily living. These factors need to be considered in any future research in this area. In line with this was the identification of the majority of wound care being performed between 7am and noon. The need to complete the majority of patient care, including a daily dressing before the next shift arrives, is a long standing issue of ward culture for this study setting.

Table 1. Mean (SD) exposure times.

	Exposure in minutes Mean (SD) total exposed cases	
Aetiology		
• Trauma	66.25	(53.15)
• Pressure ulcers	163.12	(126.00)
• Other	66.00	(50.14)
Wound dressing product		
• VAC	159.92	(115.99)
• Iodosorb	46.63	(42.52)
Reason		
• Registrar/resident	115.94	(98.97)
• Scheduled	75.36	(94.60)
• Other	49.83	(81.36)
Infection	144.00	(117.02)
No infection	72.56	(63.42)

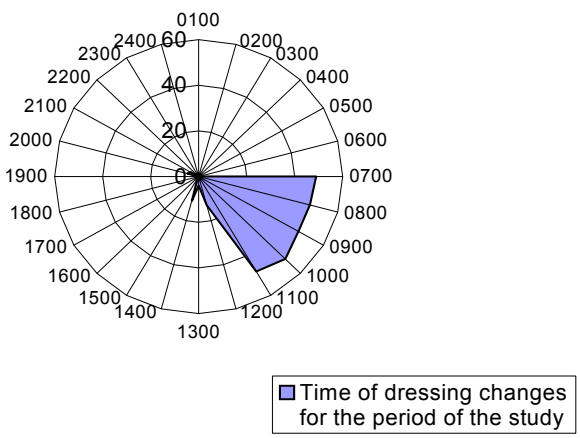
Conclusion

There are many phenomenons that impact on wound dressing changes – this study has only touched on some of the possible variables that could be addressed to help counteract the length of exposure during wound dressing changes. One of the main issues impacting on the length of wound exposure in this study was found to be wound assessment practices. Established plans of care to ensure continuity of care by health professionals is recommended; with assessment of wound dressings being prioritised by need of evaluation of treatment. This may assist with the multidisciplinary assessment of patients, ensuring efficient use of resources and positively impacting on wound healing and patient satisfaction, via a decreased number of wound exposures. However, there will still be times when additional wound assessments may be required due to the changing wound status.

Nurses can address the reasons associated with wound exposure by changing their practice to accommodate circumstances in the study setting as they stand. Assessment of wound dressings is a necessity and temporary dressing practices would appear to be a practice that is here to stay. Education about the application of moist wound healing dressings in the circumstance that the patient awaits assessment is one thought.

There is no evidence as yet that wound exposure is harmful to wound healing; however, the literature states that moist, warm environments are beneficial to healing, which suggests that current practice could have detrimental effects. Further research needs to be undertaken to determine whether or not the length of time a wound is exposed is detrimental to wound healing as well as the impact on the patients' well being. Another area that would also provide valuable information is further research in relation to staff mix and staff-patient ratio.

Figure 5. Time of day dressing changes occurred.



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