

Client perceptions of two types of antimicrobial dressings and compression bandaging

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Abstract

Client perceptions of wound treatments represent an important but often overlooked aspect of research which principally focuses on the clinical effectiveness of treatments. In a large multi-site randomised controlled trial (RCT) comparing a nanocrystalline silver dressing and cadexomer iodine dressing, which were used in conjunction with multi-layer compression bandaging, client perceptions about the acceptability of these antimicrobial products and compression bandaging were evaluated. Data from 207 participants were analysed, representing a 74% response rate of the 281 RCT recruits. Both antimicrobial dressings were rated highly, with the majority of respondents willing to use their randomised treatment in the future if the need should arise. There was no significant difference in ratings of the acceptability of the nanocrystalline silver dressing and cadexomer iodine dressing. The acceptability of compression bandaging was high as was willingness to use compression bandaging again. Though adherence to compression bandaging was significantly associated with higher satisfaction ratings, acceptability of the treatment remained high, even for those clients not adhering to compression bandaging regimes. This result challenges the perception that a lack of client willingness to use compression bandaging is a principal driver of non-adherence to this treatment. Clearly other factors influenced adherence and these require further investigation if the benefits of this best practice treatment are to be realised.

Introduction

Leg ulceration is a chronic condition, with significant implications for those living with them, health professionals and the community, given the resources required to treat these wounds. The prevalence of leg ulceration has been identified as affecting 1.1 to 3.0 per thousand of the adult population in Australia¹, with the incidence of leg ulceration expected to increase, given Australia's ageing population. It is not atypical for leg ulcers to last for years, with recurrence rates up to 69% of venous leg ulcers². The emotional, physical and social costs to the individuals affected³⁻¹² are not only considerable but often prolonged and recurrent. In 1994, the monetary cost of leg ulcers was estimated at up to A\$431 million per annum¹³, increasing to A\$3 billion per annum in 2005¹.

Moist wound dressings and graduated compression therapy represent the best practice treatment for most lower leg ulcers¹⁴, with multi-layer compression bandaging therapy considered the gold standard in venous leg ulcer management¹⁵. For the uncomplicated leg ulcer, this treatment is usually successful and the ulcer will heal.

One factor that complicates the healing process is bacterial burden. Healing is impaired when the bacteria in a wound reaches a critical level, at which stage intervention is necessary to prevent deterioration and to aid healing¹⁶. Bacterial

burden must be managed to prevent delayed healing, the development of infection and complications such as cellulitis, sepsis or even death. The use of primary dressings with antimicrobial properties is clinically indicated¹⁷⁻¹⁹ when bacterial burden is unlikely to be managed by drainage, debridement or cleansing alone¹⁶.

Applying appropriate treatment results in improved healing rates and quality of life (QoL) of those affected^{20,21}. To accelerate healing and avoid the recurrence of ulcers, these treatments require choices which impact on daily living². This includes adherence to recommended compression bandaging and wound dressings.

The focus of most research that is conducted in relation to specific wound treatments is conducted with the aim of investigating the clinical, and occasionally, the cost-effectiveness of treatments. The absence of research in the literature reporting clients' impressions regarding the acceptability of treatments highlights that this is a frequently overlooked aspect of clinical care research. With limited client acceptability and adherence to a treatment, the capacity of any treatment regardless of its clinical effectiveness to address the clinical problem is undermined.

There is evidence that many clients receiving wound care are either not receiving best practice care or not adhering to

the treatment recommended²²⁻²⁴. The issue of problematic adherence to best practice wound care treatments has been considered in relation to compression therapy. Estimates of adherence with compression therapy range from 2% to 42% in randomised controlled trial (RCT) studies to a higher estimate of 10% to 80% identified in what they refer to as "real-world" studies^{25,26}. Two RCTs^{27,28} investigated adherence among people with active ulceration though assessed adherence with Class 3 stockings and short-stretch bandaging. Though the exact level of compression delivered from these compression therapy types requires more clarity, it is clear that they do not represent best practice multi-layer

compression therapy. These studies reported high adherence rates in excess of 80% for both treatments.

Studies have also investigated the barriers to compression bandaging adherence. A range of factors has been identified, which relate to the confidence and skill of the health professional, a number of patient factors such as poor understanding of the reason for the treatment, discomfort, and lifestyle restrictions, as well as contextual constraints such as the cost of treatment^{25,29,30}.

To help address the gap between evidence of the clinical effectiveness of wound treatments and their acceptability to clients, during a 2006 RCT, which compared the clinical and cost-effectiveness of two antimicrobial dressings³¹, client perspectives of the antimicrobial treatments and multi-layer compression bandaging were also evaluated.

This paper presents the results of this client evaluation of a nanocrystalline silver dressing (Acticoat™), cadexomer iodine dressing (Iodosorb™), and compression bandaging in the management of infected or critically colonised lower leg ulcers. The aim of the study was to describe and compare the client-reported acceptability of these two antimicrobial dressings, as well as compression bandaging, and examine the impact of client perspectives of the treatments on their level of adherence.

Method

The RCT commenced in March 2006 and data collection was finalised in May 2007. It was conducted by two of Australia's largest community home nursing services. A total of 281 community nursing clients participated in the trial (180 from a one-study site and 101 from the other site).

Clients from the two services were eligible if they had a lower leg ulcer (not pressure ulcer) with ankle brachial pressure index (ABPI) of 0.6 or above, the wound was 15cm or less in diameter; were 18 years or older; had not been on a course of topical antiseptic treatment one week prior to recruitment; were not using any antibiotics 48 hours prior to recruitment; were not using systemic steroids; did not have a diagnosis of diabetes or malignancy related to the leg ulcer; were not receiving palliative care and had no known contraindication to the treatment products. Furthermore, their wound needed to be showing at least one of ten clinical signs of infection or critical colonisation, which are signs identified by the literature^{17-19,32-34}.

The RCT used an open-label, parallel-group design, in which participants were randomly allocated to receive either nanocrystalline silver (Acticoat™) and cadexomer iodine (Iodosorb™) dressings. These products are henceforth referred to as silver and iodine.

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All study participants were recommended compression bandaging. Bandaging was chosen according to the ABPI result obtained using hand-held Doppler ultrasound together with lower limb assessment on recruitment. Typically, clients with an ABPI of 0.8–1.2 were recommended the Profore™ four-layer compression system (incorporating Softban™, crepe bandage, Profore 3™ bandage, and CoPlus™ adhesive bandage) and clients with an ABPI between 0.6 and 0.79 or >1.2 were recommended Profore™ Lite (the latter incorporating Softban™, crepe bandage, and CoPlus™ adhesive bandage).

To eliminate cost as a possible reason for non-adherence, the trial subsidised the antimicrobial products and compression bandages if existing funding arrangements, which varied at the study sites, meant that these products were not available to clients free of charge.

The trial was registered with the Australian and New Zealand Clinical Trials Registry and ethics approval was received from each organisation's Human Research Ethics Committee. For more detail about the RCT method, the reader is referred to the main project report³¹.

Trial participants were surveyed either when the randomly allocated antimicrobial treatment ceased or when the client ceased their participation in the trial following a 12-week study period. The timing of the survey ensured that client impressions of the treatments were current, especially for those completing the antimicrobial treatment before the end of the 12-week study period. Participants were encouraged to return the survey via a reply paid envelope, addressed to the study coordinator for each site, though the option to hand the survey back sealed in the reply envelope to the attending nurse instead, who returned it to the study coordinator, was also provided.

Clients who experienced an adverse response to the antimicrobial to which they were randomised (for example, a sensitivity or unresolved pain) were instructed to complete the questionnaire for the randomised antimicrobial regardless of any subsequent treatment they received.

Data collection tools

Data were collected via a hard copy, self-report questionnaire. A customised tool was developed for this research given that no existing validated tools regarding client preferences or experiences of wound treatments was identified in a search of the literature. The project team, which included wound clinical nurse consultants and researchers, discussed the experience of dressing application, removal and the duration of its application. A series of 'occasions' was agreed upon, for which it was considered that client assessment of the dressings would need to be evaluated as impressions of the treatments could vary at these times. These 'occasions' were included as the items in the survey tool which participants

were requested to rate and included the acceptability of the treatment dressing procedure; comfort of the treatment immediately after application; comfort of the treatment over the period between dressing changes; ease of dressing/bandaging removal and overall acceptability of the treatment. The survey tool measured participants' agreement with these statements for the antimicrobial dressing to which they were randomised in the trial and compression bandaging. The response categories included:

1. Completely agree.
2. Moderately agree.
3. Moderately disagree.
4. Completely disagree.

Participants were also asked to indicate whether they would or would not be willing to use the antimicrobial dressing and compression bandaging again. The survey tool was a single page in length. Though the instrument was not piloted with clients prior to its use, internal reliability for the questionnaire was high (Cronbach's alpha=0.89).

Data analysis

The Statistical Package for the Social Sciences (SPSS) for MS Windows Release 15.0 (SPSS Inc., Chicago, IL) was used to analyse the data. An alpha level of 0.05 was used to classify the findings as significant. Significant differences between antimicrobials, sites and clients adhering to their treatment plan were assessed using chi-square. To optimise the sample in the analysis, avoiding low cell sizes, a number of variables were recoded combining categories. Where data were represented as two-by-two tables, the continuity correction result was reported.

Results

The RCT recruited 281 clients from the two sites. These participants were randomised in equivalent proportions to one of the two trial antimicrobials: 140 silver and 141 iodine. All trial participants were given the client survey, of which 210 clients returned the survey. Response rates to the client survey varied considerably by site. At Site 1, which had 180 recruits, 109 survey forms were returned, achieving a 61% response rate. As three of these forms were returned without client identifying numbers attached, the antimicrobial those clients had used could not be identified, permitting an analysis of 106 forms, with a final response rate of 59% at this site. At Site 2, all 101 recruits returned the forms, providing a 100% response rate. This variation in response rate reflected a difference in how each site implemented their follow-up of clients who were non-respondent. The site achieving a 100% response rate conducted repeated telephone follow-ups, with either the client's primary nurse or, on occasion, directly with the client to ensure the survey was returned. The other site

did not follow up study participants if the survey was not returned after its initial distribution. The overall response rate across the two sites was 74% or 207 out of the total 281 RCT participants.

Both treatment groups were equally represented among respondents: 52% (n=107) using the silver antimicrobial dressing and 48% (n=100) using the iodine antimicrobial dressing, and reflected the distribution of antimicrobial use in the overall RCT sample.

Table 1 presents the demographic characteristics of survey respondents. No significant differences were found between the antimicrobial treatment and demographic characteristics of these respondents.

Client satisfaction with the antimicrobial treatments

Table 1. Demographic characteristics of survey respondents by antimicrobial treatment.

| | n= | Iodine | Silver |
|--|-----|-------------|-------------|
| Antimicrobial treatment (%) | 207 | 48.3 | 51.7 |
| Gender (% female) | 205 | 57.6 | 51.9 |
| Age in years (Ave ± SD) | 200 | 78.7 ± 11.7 | 79.4 ± 13.0 |
| Country of origin (% born in Australia) | 205 | 73.7 | 77.4 |
| Language spoken at home (% English spoken at home) | 204 | 100.0 | 98.1 |

Table 2 details participant responses to statements regarding the antimicrobial treatments. Participants typically "completely/moderately agreed" with positive statements about the comfort and acceptability of the antimicrobials during application, immediately after application, until the dressing was changed and during the removal of the dressing. Even when satisfaction was at its lowest for the statement regarding the comfort of the dressing over the period until it was changed (19.2% for iodine and 15.9% for silver), the majority of participants still agreed that the antimicrobial was comfortable for the duration of use (88.9% for iodine and 91.6% for silver).

Chi-square analysis was conducted to compare participants' agreement with the statements for iodine and silver. No significant differences between the assessments of the respective products were observed for any of the dimensions.

Willingness to use the antimicrobial again was also considered. Most participants (84.4%) were willing to use the antimicrobial treatment to which they were randomised

Table 2. Client ratings of the antimicrobial treatments (n=206).

| Completely/moderately agree (%) | Iodine | Silver | χ^2 (df) |
|--|--------|--------|---------------|
| Acceptability of procedure | 96.0 | 99.1 | 0.988 (1) |
| Comfort of treatment immediately after application | 85.9 | 91.6 | 1.174 (1) |
| Comfort of the treatment over the entire period | 80.8 | 84.1 | 0.194 (1) |
| Ease of removal | 93.9 | 96.3 | 0.203 (1) |
| Overall acceptability of the treatment | 88.9 | 91.6 | 0.175 (1) |

* Significant <0.05 ** Significant <0.01 *** Significant <0.001

in this trial again if required in the future. There was no significant difference found between the antimicrobial the client used and their willingness to use the antimicrobial again (86.0% silver; 83.2% iodine).

Given the differences in response rate by site, with the potential that the non-respondents at the site with the lower response rate represented a different experience or impression of the antimicrobial or compression bandaging treatments, chi-square tests were conducted comparing satisfaction levels by site. With respect to the antimicrobial, significant differences in ratings by site were identified for comfort of the treatment for the whole time [$\chi^2(1)=4.609$, $p<.05$], overall satisfaction [$\chi^2(1)=7.435$, $p<.01$] and willingness to use the antimicrobial again [$\chi^2(1)=15.715$, $p<.001$]. In each instance, satisfaction was higher at the site with the lower response rate, compared to the site representing all study participants; 88.6% compared to 76.2% for comfort for the whole time, 96.2% compared to 84.0% for overall satisfaction, and 95.1% compared to 74.0% for willingness to use the antimicrobial again. For both study sites, however, satisfaction with the antimicrobial treatments remained at or above three-quarters of participants on all dimensions considered. Satisfaction with the two antimicrobial treatments was considered separately for each site and there remained no significant differences by antimicrobial at either site

Client satisfaction with compression bandaging

Responses to the compression bandaging questions were received from 201 participants: a 72% response rate for the total trial sample. Thus, five survey respondents did not complete any of the compression bandaging questions. A further three respondents had one missing response to the five items; hence the response sample varies by item.

Table 3. Client ratings of compression bandaging.

| Completely/moderately agree (%) | n= | % |
|--|-----|------|
| Acceptability of procedure | 199 | 93.0 |
| Comfort of treatment immediately after application | 201 | 87.6 |
| Comfort of the treatment over the entire period | 201 | 77.1 |
| Ease of removal | 201 | 95.5 |
| Overall acceptability of the treatment | 200 | 85.5 |

As shown in Table 3, clients generally agreed that compression bandaging was acceptable during application (93.0%), immediately after application (87.6%), and comfortable during removal (95.5%). There was less positive endorsement for the acceptability of bandaging comfort over the entire period until it was changed (77.1%). Overall satisfaction with compression bandaging was high (85.5%), though it is noteworthy that when participants were dissatisfied (14.5%), it was often to the extreme (10.4% "completely disagreed" with the acceptability of compression bandaging). Most respondents (77.2%) were willing to use compression bandaging again.

Comparisons of satisfaction with compression bandaging were conducted by site. Significant differences in ratings by site were identified for overall satisfaction [$\chi^2(1)=5.531$, $p<.05$] and willingness to use compression bandaging again [$\chi^2(1)=6.592$, $p<.05$]. Again, satisfaction was higher at the site with the lower response rate, compared to the site representing all study participants: 91.9% compared to 79.2% for overall satisfaction, and 85.9% compared to 69.3% for willingness to use compression bandaging again.

Satisfaction and adherence to care plan

The relationship between client ratings of treatment acceptability and adherence to treatment during the trial was examined (Table 4). As there were few adverse events recorded during the trial to the antimicrobials, eight relating to iodine and 13 relating to silver³¹, an examination of satisfaction ratings and adherence to the antimicrobial treatment was not pursued. However, with only 57% of clients adhering to the compression bandaging treatment as reported in the main RCT findings, this analysis explored how levels of satisfaction with compression bandaging relate to compression bandaging adherence.

Adherence to compression bandaging among those responding to the survey was comparable to that observed for the overall RCT sample: 62% for the survey compared to 57% for the RCT sample with no significant differences observed by site.

There was a significant difference in acceptability ratings ("moderately or completely") between clients who adhered to the treatment compared to those not adhering for the treatment application (97.5% compared to 86.1%) [$\chi^2(1)=7.626$, $p<.01$], immediately after application (93.4% compared to 79.5%) [$\chi^2(1)=7.301$, $p<.01$], and for the comfort of the bandages for the entire treatment time (83.6% compared to 68.5%). There was no difference in ratings of the acceptability of removing the bandages (98.4% compared to 93.2%). Clients adhering to compression bandaging also rated compression therapy as more acceptable overall than those who did not adhere (93.4% compared to 75.3%) [$\chi^2(1)=11.430$, $p<.01$]. Despite the significant difference in ratings, a high level of overall acceptability of compression bandaging among those not adhering to the treatment remained. Willingness to use compression therapy again was also moderately high for clients adhering and not adhering to the treatment (82.4% compared to 69.6%); the difference was not significant.

As shown in Table 4, significantly more clients adhering to the treatment rated the acceptability of the procedure and comfort of the treatment immediately after application as more acceptable than those not adhering at one site (Site 1 in Table 4). At the other site (Site 2), those adhering to the treatment were significantly more likely to rate as acceptable the comfort of the treatment for the duration of the treatment as well as the acceptability of compression therapy overall.

There was no significant difference between those clients adhering and those not adhering to their compression treatment for their willingness to use compression therapy again by site. Most clients, 92.6% adhering and 76.5% not adhering to their treatment at Site 1, and 73.8% adhering and 62.9% not adhering to their treatment at Site 2, were willing to use compression therapy again.

Discussion

The majority of participants rated the iodine and silver dressings positively on all dimensions. The acceptability of both dressings was high with no significant differences between the silver or iodine antimicrobials in client ratings overall or on any dimension assessed. That is, both dressings were rated similarly in terms of their acceptability of treatment procedure, comfort both immediately after application and while the dressing was in situ and ease of removal. Respondents were willing to use the antimicrobial to which they were randomised again.

Although important to formally evaluate, this result is perhaps not surprising as both antimicrobials are commonly used in the treatment of wounds that show signs of bacterial burden and that known adverse events to either product was an exclusion criterion from the trial. These specific antimicrobial products were selected for the trial as they

were well-represented and demonstrated favourable healing outcomes as reported by the published literature.

These results indicate that clients regard both antimicrobial treatments as acceptable. Clinicians can, therefore, prioritise other criteria when selecting either silver or iodine antimicrobial treatments and be reassured that, in most instances, clients would consider either treatment acceptable.

Significant differences in client ratings were detected between the two study sites on some dimensions. Given differences in the response rates that were achieved by the sites, 59% and 100% respectively, with satisfaction higher at the site with the lower response rate, it is suggested that non-respondents might have been more dissatisfied with the treatment. It is important to note that, despite site-based differences, the acceptability of and willing to use the antimicrobial treatments again remained high at both sites.

The acceptability of compression bandaging was also rated highly, particularly for ease of removal, acceptability of procedure, comfort of treatment immediately after application and comfort of the treatment for the entire period. The comfort of the treatment for the entire period received less endorsement, though most respondents still felt this aspect of compression bandaging therapy was acceptable. More than three-quarters of participants were willing to use compression bandaging again. Furthermore, site comparisons showed significant differences in ratings of compression bandaging for some dimensions with satisfaction higher at the site with the lower response rate, perhaps suggesting that non-respondents were less satisfied with the treatment.

Regardless of which site's data were considered, satisfaction with and willingness to use compression bandaging again remained high.

Adherence to compression bandaging was comparable between the sample responding to the survey and the RCT sample overall (62% compared to 57% respectively). This is in excess of adherence rates observed in reviews of the literature, suggesting adherence ranges between 2% and 42%^{25,26}, but is less than the 80% and greater found with two RCTs which did, however, assess treatments other than multi-layer compression bandaging^{27,28}. In general, this would suggest adherence with compression bandaging was quite good in this sample when compared to other studies. Yet adherence with compression bandaging remains problematic.

It is interesting that satisfaction with compression bandaging and willingness to use compression bandaging in the future was higher than the level of adherence and high amongst those not adhering. These results, gained in a trial environment where clinician and cost barriers were minimised, challenge the perspective that the principal barrier to ongoing adherence with compression bandaging is due to client barriers and acceptability. It suggests that other factors are responsible for non-adherence. While the literature has nominated a number of reasons why non-adherence to compression bandaging occurs^{25,29,30}, with many of these factors controlled in the trial, and with client perspectives of the acceptability of compression bandaging not reconciling with client adherence to the treatment, this research highlights the need for more extensive investigation of this issue.

Table 4. Client ratings of compression bandaging segmented by adherence to treatment.

| Completely/ moderately agree (%) | Site 1 | | | | Site 2 | | | |
|--|--------|----------|--------------|------------------|--------|----------|--------------|------------------|
| | n= | Adhering | Not adhering | χ^2 (df) | n= | Adhering | Not adhering | χ^2 (df) |
| Acceptability of procedure | 93 | 98.2 | 83.8 | 4.754 (1)* | 100 | 96.9 | 88.6 | N/A [^] |
| Comfort of treatment immediately after application | 95 | 98.2 | 78.9 | 7.779 (1)** | 100 | 89.2 | 80.0 | 0.935 (1) |
| Comfort of the treatment over the entire period | 95 | 84.2 | 73.7 | 0.990 (1) | 100 | 83.1 | 62.9 | 4.051 (1)* |
| Ease of removal | 95 | 100.0 | 89.5 | N/A [^] | 100 | 96.9 | 97.1 | N/A [^] |
| Overall acceptability of the treatment | 95 | 98.2 | 86.8 | 3.269 (1) | 100 | 89.2 | 62.9 | 8.310 (1)** |

* Significant <0.05 ** Significant <0.01 *** Significant <0.001

[^] 50% or more cells had fewer than 5 cases.

Though satisfaction remained high for those clients not adhering to compression bandaging, significantly higher ratings were observed among those adhering to the treatment. This result, therefore, suggests that client satisfaction with compression bandaging is an important indicator of whether a person complies with the treatment.

A key limitation to be mindful of with this research is the representativeness of the sample. The sample can not be said to be generalisable to the general community nursing population of clients with a venous or mixed ulcer because of the eligibility criteria which were applied for the trial. Indeed, these trial participants were well-informed of the need to receive an antimicrobial dressing and compression bandaging treatment when consenting to participate in the trial. As such, participants might have been more willing to adhere to the treatments than those who choose not to participate in the trial.

The lack of a validated tool to assess client acceptability of wound treatments poses another limitation for the study. Though it was pleasing and reassuring that the survey tool was completed with minimal missing data and had good internal consistency, piloting the tool prior to its use would have added to the rigour of this evaluation. The development

of a well-designed and validated tool to evaluate client perspectives of wound treatments might encourage more researchers to consider client perspectives as well as the clinical and cost-effectiveness of treatments in the future.

The differences in method employed by sites for following up questionnaires and the resultant response rates, would seem to be associated with differences in client ratings of the treatments. One possible interpretation of this difference is that non-respondents were less satisfied with the treatments and their absence from these data for the site with the lower response rate resulted in artificially inflated acceptability ratings. This research provides an interesting case study as to what response rates can be achieved when progressive follow-up of participants is implemented compared with no follow-up.

As already noted, the application of best practice wound management results in improved healing rates and QoL of clients^{20,21}. The acceptability of treatments for clients, however, is not frequently evaluated, even though these treatments can have significant lifestyle implications². It is of critical importance that more work is conducted to understand and intervene where modest adherence is observed, as is the case with compression treatments. If the treatment itself or how

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the treatment is presented to the client and managed can be adjusted to optimise adherence, then those living with a leg ulcer, healthcare providers and the community in general stand to benefit from expedited healing and the prevention of ulcer recurrence.

Conclusion

This research has shown that both silver and iodine antimicrobials and compression bandaging are well-accepted treatments among clients, with the majority willing to use these treatments again. Even though adherence to compression bandaging was associated with greater satisfaction with the treatment, acceptability of compression bandaging remained high in spite of non-adherence. These results challenge the perception that client dissatisfaction with the treatment is a principal driver of non-adherence with compression bandaging and highlights the need for more research to explore reasons for non-adherence to compression bandaging.

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