Evaluation of Two Different Low Frequency Ultrasound Debridement Devices in a Community Based Wound Clinic

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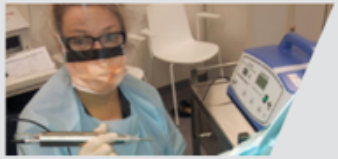


Background

Biofilm forms in over 60% of chronic wounds and impedes wound healing (1). Low Frequency Ultrasonic Debridement has been utilised in Australia for over 10 years and has been shown to improve healing by breaking down both slough and biofilm, and enhancing fibroblast formation (2). Two different devices are available on the Australian market with limited evidence to support their use. RDNS SA (part of the SilverChain Group) identified the need to evaluation these devices prior to equipment acquisition. The devices identified for evaluation were i) the Debriflo – Ultrasonic Wound Irrigation (UWI) device and ii) the Sonica-185® device.

Aims

To conduct an internal evaluation of two Low Frequency Ultrasound Debridement (LFUD) devices: Debriflo-Ultrasonic Wound Irrigation (UWI) and Sonica-185® within a community based wound clinic and assess the outcomes of these treatments on chronic non-healing wounds.

Table 1. Low Frequency Ultrasound Device Features

Device Features	Debriflo UWI	Sonica-185®
Ultrasonic frequency range	30-40 kHz	10-100 kHz
Handles	Heavier balanced handle Single contact head	Lighter heavier at distal end 3 different contact heads
Weight of Unit	7kgs	11kgs
Foot pedal	Optional	Must be used to operate device
Consumables	Any type IV line	Device specific Suction option
Time per cm2	Maximum 30 seconds per cm2 for contact debridement	20 seconds per cm2 for contact debridement 30 seconds per cm2 for noncontact
Approximate Cost	Unit $25,000 Handles $1500 each	Unit $70,000 Handles $5000 each Suction optional extra

Methods

Ethics submission was completed and submitted to the SilverChain Human Research Ethics Committee lead who approved this evaluation as a negligible risk project. A convenient sample of 39 clients was evaluated with inclusion criteria of no healing in the previous 4 weeks and where standard care had been provided prior to commencement of LFUD treatment. LFUD treatment round consisted of weekly treatments for 4 weeks then a 2 week break with repeat rounds as required. Topical antimicrobial dressings were applied post debridement.

The clinical outcomes from the two LFUD device groups (N=39 clients) were evaluated over a 10 month period with a crossover of 10 clients who received treatment with both LFUD devices. Of the crossover client group, six completed a written survey of their experiences with both devices and the data were collated. Staff LFUD experiences were collected in the form of a staff interview. Wound digital imaging and measurements were undertaken at each visit to ascertain accurate wound healing rates. Client demographics and characteristics were also identified.

Results

Client Demographics

Demographics of both client groups are reported in **Table 2**. Given it was a convenience sample, the group characteristics are in the main similar.

Healing Rates

Combined complete wound healing and significant wound healing (60-99% surface area reduction during the study period) percentages were 67% (26/39). Total wound healing rates by aetiology are noted in **Figure 2**. The percentages were 76% (16/21) for the Debriflo-UWI and 55% (10/18) for the Sonica-185®. These are presented in **Figure 3**.

Table 2. Cohort Demographics

Client Demographics (N=41)	Debriflo – UWI (n=21)	Sonica-185® (n=18)
Age		
> 60 Years	17	14
< 60 Years	4	4
Gender		
Female	13	7
Male	8	11
Comorbidities		
Less than 3	0	0
3 or more	21	18
Wound Chronicity		
3 - 6 months	7	3
> 6 - 12 months	2	2
1 - 2 years	7	7
2 - 5 years	2	4
> 5 years	3	2

Figure 2

Figure 3

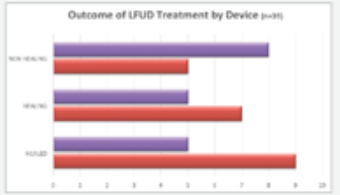
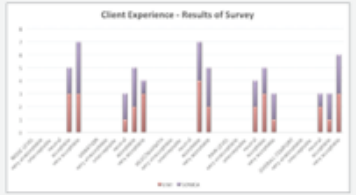


Figure 4



Client and Staff Feedback

Clients who received treatment from both devices provided feedback and noted similar experiences between devices (presented in Figure 4). Overall both units were rated by clients in the majority as acceptable or very acceptable in all categories including noise level, vibration, heat/warmth, pain levels, and overall comfort experienced. Staff interviews noted similarities for device units regarding noise, vibration, handpiece comfort, device set up and cleaning of equipment. Staff reported increased occupational health and safety issues with the Sonica-185® long cords, unit weight and the required use of the foot pedal led to sustained uncomfortable positions, possibly due to the pedal design. Staff and client feedback, clinical outcomes from both device groups, and associated expenses were used to inform purchase of the unit for ongoing treatment in the community based wound clinic.

Limitations

Observed client experiences with LFUD identified that pain and comfort appeared to reduce in proportion to the number of treatments provided. In the crossover client group the Debriflo-UWI was the first device used in the study and this could be perceived to be more painful for this cohort who experienced both devices. The small sample size and the clinic availability, operating on average 2.5 days per week during the evaluation period, were other limitations of this evaluation.

Discussion

The healing rates between devices were similar though slightly more healed within the Debriflo-UWI cohort, however due to small sample size these findings cannot be generalised. These results highlight similarities in client experiences, however staff feedback noted differences in equipment use and outcomes which led to unit selection. This information was formulated as an internal device evaluation and may assist other clinicians when considering purchasing such devices.

Disclosure

We formally thank the following for their kind loan of the LFUD units:

1. Cheryl Frank
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2. Robyn Ridings
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References

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