MEETING REPORT

The role of surfactants in mechanical debridement

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Wounds UK

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This article is based on a Made Easy workshop held at the Wounds UK annual conference in Harrogate, UK, on 6th November 2018. The aim of the workshop was to provide practical information about the importance of performing routine mechanical debridement in all chronic wounds as a fast and efficient method to help move wounds towards healing. Effective cleansing and debridement of wounds reduces the risk of infection and associated complications, by removing potential obstacles to healing, including slough and necrotic tissue (Benbow, 2011). The workshop considered evidence for using the UCS® debridement cloth (medi UK).

THE HIERARCHY OF DEBRIDEMENT

It is widely accepted that wound debridement is necessary for optimal wound healing (Haycocks and Chadwick, 2012). Historically, sharp or surgical debridement sat at the top of the debridement hierarchy pyramid, explained speaker Trudie Young (Director of Education and Training and Tissue Viability Nurse at the Welsh Wound Innovation Centre). However, in recent years, this approach has been called into question and quicker, simpler debridement that can be performed in the community setting is becoming a priority, preventing patients having extended periods with non-viable tissue in their wound, which delays healing and increases risk of infection (EWMA, 2013).

Sharp debridement is time-consuming, requires a certain level of skill and clinician competence, and can be painful, and is therefore inappropriate for use in certain types of wounds or situations. Autolytic debridement is comparatively slow, taking approximately 2 weeks versus 20 minutes for mechanical debridement. "Speed is an incredibly important factor for the patient," highlighted Trudie, before discussing other ways in which wound care has changed over time.

The approach to wound care has shifted from passive to an emphasis on more active interventions. "With the discovery of biofilms, it is now broadly acknowledged that all wounds should be cleansed and debrided to aid healing; where previously wounds that looked relatively clean would not be cleansed at each dressing change." This shift in part explains the requirement for more straightforward, quicker and pain-free approaches to debridement (Wolcott et al, 2010).

UCS DEBRIDEMENT CLOTH

The UCS debridement cloth was discussed as an effective tool to assist in mechanical debridement. Trudie described the components of the cleaning cloth, paying special attention to the inclusion of surfactant.

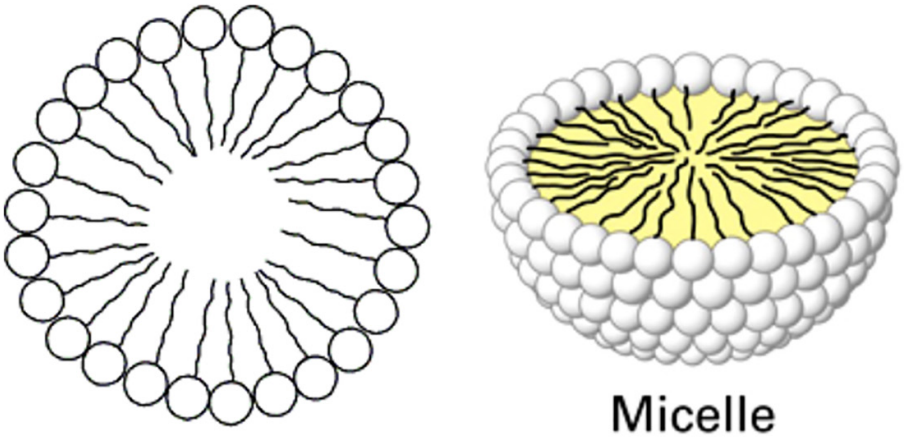
"Surfactant is a very safe, deep cleansing agent that has been used for many years in the most sensitive of areas, such as cleaning contact lenses. The UCS cloth is impregnated with surfactant, and two other substances: a skin softening keratolytic agent, and a moisturising emollient."

Surfactant is a complex naturally occurring substance made up of six lipids and four proteins. The molecules contained in surfactant have hydrophilic heads ("water loving") and hydrophobic tails ("water hating") and at higher concentrations and temperatures in water they form micelles *(Figure 1)*. It is this that enables the drawing action that removes and traps dirt.

Surfactant, naturally produced in the lungs, lowers the surface tension between two liquids or between a liquid and a solid. In its naturally occurring form it functions to reduce the surface tension of fluid in the lungs, making respiration easier. It also helps to make the small air sacs in the lungs (alveoli) more stable.

Surfactant can be synthetically created and has diverse commercial uses where the separation and extraction of dirt is required. For example, surfactant is used to treat water that has been contaminated by oil slicks, is a common ingredient in washing up liquid and micellar water forms the basis of most make-up removers. As a skin cleanser, surfactant help to naturally lift and remove dirt oil, dead skin cells and impurities

Figure 1. Surfactant mode of action



Individual molecules combine. The water phobic tail parts of the molecule collapse in on themselves, to avoid water. The charged groups, which like water, are exposed to the outside, creating a stable sphere or 'micelle'. The water phobic interior sucks in other water phobic molecules e.g. oils, fats and proteins and holds them within the micelle, thus emulsifing or dispersing them as micro particles in water.

from the skin without the need for astringents or abrasive rubbing.

In wound care, surfactants work by changing surface tension of the wound bed, which then enables penetration and disruption of the biofilm attachment (IWII, 2016). "Surfactants may be able to penetrate biofilm and reduce their impact on healing," explained Trudie.

The UCS debridement cloth combines the cleaning properties of surfactants with loop technology to further enhance gentle, pain-free and thorough cleansing. The loop formation of the cloth lifts and removes debris away from the wound bed and peri-wound when applied with a gentle polishing motion (no requirement for rubbing). Attendees of the workshop had the opportunity to test out the simple cleaning method, using very little pressure in a light polishing movement to clean ink off the backs of their hands.

EVIDENCE FOR USING UCS CLOTH

Trudie presented the evidence for using the UCS cloth in the mechanical debridement of chronic wounds. A research study comparing UCS debridement cloth verses gauze and saline among 62 in-patients and outpatients, with leg ulcers of various aetiologies found marked improvements with UCS (Mosti and Gasperinis, 2016). The study measured the moisture condition of the skin, bacteria levels, wound bed and hyperkeratosis.

Trudie also demonstrated how she had tested the UCS cloth in clinical practice, in four patients with sloughy leg wounds. While playing a video of the cleaning process in one patient, Trudie described her actions. Using little to no pressure and the previously described gentle polishing motion, she was able to carefully and effectively clean the wound, removing dirt and debris from the wound bed and peri-wound skin while preserving healthy tissue *(Figure 2)*. Every inch of the cloth can be used. The active substances in the UCS cloth continue working after application and should not be washed away after cleaning, but rather, leaves a healthier skin for other emollients or topical treatments to be applied as necessary. Trudie also described to delegates how the device can be used in cavity wounds. "UCS cleans safely right down to the bone. You can squeeze the cloth to extract the surfactant, keratalytic agent and emollients into deep cavities, and leave the solution to do the work while you clean the surrounding skin."

Overall, the device was found to be "very good for cleaning both the wound bed and surrounding skin, especially in hyperkeratosis and for inter-digit cleansing." Patients reportedly found the process of mechanical debridement using the UCS cloth "entirely pain-free".

This approach to mechanical debridement can

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Figure 2. Sloughy leg wound before and after cleaning with UCS debridement cloth

be considered superior to traditional wet-to-dry mechanical debridement, such as gauze, whereby the top layer of the wound bed dries and adheres to the dressing, which is then removed. This is non-selective as, on removal, the dressing takes with it both healthy and unhealthy tissue and can traumatise healthy or healing tissue (Wounds UK, 2011).

CONCLUSION

Mechanical debridement is a fast and effective way of cleaning wounds and the periwound skin in wounds with mixed aetiology. The UCS debridement cloth, which contains surfactant, emollient, and a keratolytic agent, provided an effective and pain-free method for mechanical debridement, as demonstrated by clinical evidence and use in practice. WUK

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