

# The use of granulated sugar to treat two pressure ulcers

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**This innovative case report presents the management of a patient with two infected pressure ulcers, one on the heel and one on the sacrum, using a granulated sugar dressing.**

## INTRODUCTION

Granulated sugar is the disaccharide sucrose and will combine with other substances such as water [1]. When sugar is applied to a wound it will normally dissolve within four hours, creating a highly concentrated environment on the wound surface. Body fluids are attracted to the wound surface to equalise the high concentration gradient (osmosis), increasing the volume of exudate produced. This appears to cleanse/irrigate the wound and to liquefy devitalised dead tissue. The dead tissue is removed each time the wound is re-dressed, promoting the generation of new tissue.

Sugar is widely used in a number of countries across Africa and there has been more limited use in the UK and the US. To date, there is scant evidence of its efficacy in infected wounds; the largest study in the US ran over a 56-month period and treated a total of 605 patients with wounds of different aetiologies. The study reported rapid wound healing when using sugar and povidone-iodine to enhance wound healing [2].

In the UK, one small case study found that packing malodorous pressure ulcers with sugar paste stopped the odour and debrided necrotic tissue [3]. More recently, Mphande *et al* (2007) compared the effects of sugar and honey on wound healing and observed no significant difference between the two [4].

The patient in the following case study is one of 21 patients who participated in a small pilot study in a UK hospital exploring the effectiveness of dry granulated sugar on exudating wounds. This study aimed to develop a protocol for use with a randomised controlled trial to compare dry granulated sugar with standard treatment.

## CASE STUDY

This report presents a 72-year-old man who had undergone surgery to remove a brain tumour 10 years previously. He had experienced weakness in his left leg, which had led to increased mobility problems. The patient was cared for at home by his family, with the help of community nurses. However, when his mobility reduced further, he spent more time in bed and he developed a pressure ulcer on his heel. After eight weeks in one hospital in the West Midlands in the UK, the ulcer had deteriorated and he was transferred to an acute specialist hospital where the pilot study was taking place. He had also developed a secondary sacral pressure ulcer.

At the acute hospital, both wounds were dressed with an alginate dressing with activated carbon (Sorbsan Plus, Aspen Medical) for two weeks. However, both wounds failed to improve and continued to deteriorate. At this point, it was proposed that the patient would be a good candidate for participation in the pilot study. After a full explanation and discussion with both the patient and his family, informed consent was obtained.

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## PRESENTATION

**Day 1:** On assessment, the right heel wound presented as a non-healing grade 3 [5] pressure ulcer measuring 5.5 x 4.5 x 0.5cm, with erythema (an indication of local infection), a high level of exudate and macerated wound margins. The wound area was tender and malodorous, even at arm's length (Fig 1).



*Fig 1: On day 1 the periwound area was red and macerated as a result of infection*

The sacral wound was a 0.5 x 0.5 x 2.5cm grade 3 pressure ulcer (Fig 2). The wound was not tender, but the surrounding area was very hard to the touch, with colour changes. Wound swabs revealed mixed infecting micro-organisms.



*Fig 2: On day 1, the surrounding skin of this sacral pressure ulcer is red, bleeding and hard to the touch, with a 2.5cm sinus*

### **Treatment plan**

The aims of treatment were to:

- Reduce the bacterial load in each wound
- Debride the dead tissue
- Remove odour
- Alleviate pain
- Promote healing.

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The patient's leg was washed with lukewarm tap water and soap to minimise bacterial spread to the surrounding skin and to prevent migration into the wound. This allowed easy visual assessment of the entire leg. Yellow soft paraffin was applied gently to the periwound skin and 15g white granulated sugar (Fig 3) was applied to either a piece of fabric dressing impregnated with povidone-iodine (Inadine, Systagenix) or tulle gauze dressing impregnated with yellow soft paraffin (Jelonet, Smith and Nephew). This was placed on top of a 20 x 40cm non-woven dressing pad (Multisorb, BSN Medical). The choice of initial dressing depended on which one was available.



*Fig 3: 30g aliquot and 15g aliquot of white granulated sugar*

The sacral area was also washed and dried. The sacral wound had a sinus 2.5cm deep and 0.5 x 0.5cm wide. Using a wound swab, 10g sugar was packed into the sinus. (This can be applied by holding open the aliquot with sterile gauze and slowly pouring small amounts of sugar in to the sinus. The sugar can then be gently packed into the sinus using a wound swab.) The sugar was secured in place with 9.5 x 9.5cm impregnated fabric or tulle gauze dressing (Inadine or Jelonet), a 20 x 40cm non-woven (Multisorb) dressing pad, and a transparent film dressing (Tegaderm, 3M Healthcare). Dressings were changed twice daily for the first five days and then daily from the sixth to the 14<sup>th</sup> day.

### **Application tips**

Applying granulated sugar to a heel wound is challenging and often requires two nurses. The easiest way is to apply sugar evenly to a piece of impregnated fabric or tulle gauze dressing (Inadine or Jelonet) that has been placed on a non-woven (Multisorb) wound dressing pad. The second nurse can then hold the patient's leg while the dressings (sugar side applied to wound) are secured using adhesive tape or appropriate bandages. Alternatively, the patient may be mobile enough to be able to place his/her heel on to the sugar dressings. If the patient is unable to do this, the second nurse can lift the leg on to the dressings and secure them appropriately. Dressings may need to be changed twice daily for the first few days to facilitate quick debridement, progressing to daily dressings when the exudate level subsides.

### **Mapping wound progress**

After 12 hours, family members and nurses reported that the heel wound was no longer malodorous. Two days later, the patient reported a reduction in wound pain. He was able to walk to the shower and could stand using a Zimmer frame.

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**Week 1 review:** On the seventh day, the heel wound bed was granulating (Fig 4). A small amount of slough was present. Maceration of the surrounding skin had resolved. The wound was producing a small amount of non-odorous exudate. The sacral wound had reduced in depth to 2.0cm (Fig 5).



*Fig 4: On day 7, the periwound was pink, with less maceration in the wound centre. Granulation tissue could be observed*

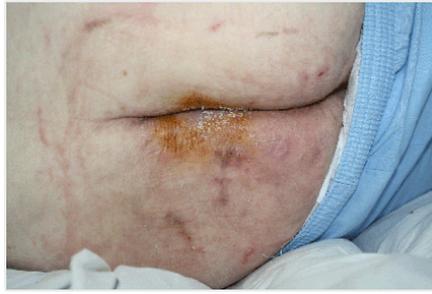


*Fig 5: On day 7 the sacral skin was pink with signs of reduced infection. The sinus had reduced in size to a depth of 2.0cm*

**Week 2 review:** On the 14th day, there was no evidence of infection and less exudate was present in the heel wound (Figs 6 ). Using a Zimmer frame the patient was able to stand and to walk to the toilet and around the bed. The decision was taken to discontinue the sugar dressing and continue with impregnated fabric or tulle gauze dressings (Inadine or Jelonet) only. The use of sugar dressings was continued on the sacral wound for another week (Fig 7).



*Fig 6: On day 14, granulation tissue was visible and central maceration is diminishing. Infection had cleared*



*Fig 7: On day 14, the surrounding skin appeared pink and soft, with less evidence of infection present*

## **CONCLUSION**

This case study reports on the successful use of a white granulated sugar dressing on a patient with two infected pressure ulcers. The heel wound was no longer malodorous within 12 hours of treatment, pain was reduced within two days and the patient was mobile using a Zimmer frame within one week. The sugar dressing facilitated autolytic debridement of the heel wound and promoted granulation tissue formation with a reduction in wound size. A moist wound bed was maintained and bacterial colonisation prevented.

This study demonstrates that sugar, which is a relatively cheap dressing (average cost per dressing change - £1.49/ 1,60 euros / 2.40 USD), can be effective on infected, malodorous wounds of different aetiology, including pressure ulcers.

However, a larger randomised controlled trial comparing white granulated sugar to standard treatment when managing exudating wounds, with parallel economic evaluation, and more laboratory work on the use of sugar dressings, has been planned to prove efficacy and cost effectiveness and to substantiate these earlier conclusions.

## **Author details:**

*Moses Murandu, MSc, PGcertEd, Cert.IHM, RGN, RM, CertPaeds, SNP, FHA, MIHM, Senior Lecturer, University of Wolverhampton, UK.*

*Carol Dealey, PhD, MA BSc (Hons), RGN, RCNT, Senior Research Fellow, University Hospital Birmingham NHS Foundation Trust and University of Birmingham, UK*

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## Expert commentary



### David Leaper

#### Visiting Professor of Surgery, Department of Wound Healing, Cardiff University, Cardiff, UK

Innovative articles and case studies like this one always make me reflect. Since the widespread adoption of the 'moist wound environment' as a pre-requisite for optimal wound healing (without much level I evidence it has to be said), there has been an unanticipated flood of dressings for wound and ulcer management. In the UK alone this huge range of dressing products, with its attendant clinical improvements and recognition of the burden of chronic wound care, is probably reaching £5 billion annually or not far off 5% of the NHS budget.

There is much more to do in bringing outstanding physiological advances and understanding to bear directly in clinical practice, and a need for further randomised, comparative clinical studies. Nevertheless, acute and chronic wound care, despite its challenges and need for resources, remains what many have called an ignored specialty: a Cinderella of global medical care.

It is fascinating therefore that a well presented case study such as this one is heralded as an innovation. Concurrent with scientific advances in wound management, which are extensive and the topic of many reviews and guidelines, there have been alternative approaches. The current excitement about honey, particularly Manuka honey, is not without some credibility of clinical effectiveness and scientific

explanation as to why it should work. But a return to sugar - sucrose - straight from the bag?

A literature search reveals a large number of reports on the value of sugar in wound management. Most are case reports, but there are some published long series. Most seem to be encouraging, with very few that are negative. There is an antibacterial effect of topical sugar (when did you see 'infection' in a jar of sugary jam other than a superficial growth of a fungus?) that has been enhanced by combination with povidone-iodine or other antiseptics in some reports. The value of sugar has also been supported by some acceptable scientific enquiry that shows that sugar can enhance keratinocyte or fibroblast activity *in vitro*, and granulation tissue and collagen formation *in vivo*, with minimal scarring in treating cavity wounds. This clinical effectiveness of sugar might be primarily antibacterial, accompanied by an osmotic (this has been described as an enhanced 'water activity'), or debriding effect, but may also be a direct topical nutritive effect. Perhaps we should be looking at hypertonic amino acids as well!

Sugar has been used in wounds for 3000 years and still is in traditional and cultural medicine. It is clearly attractive to developing countries as it is cheap and available, and attractive to sugar manufacturers as it presents a positive effect rather than dental caries, obesity and the relation to diabetes mellitus. Is it as good as honey? Is it as good as currently available dressings and topical antibacterials? Without comparative randomised studies we shall not know, but this study and many of its predecessors do beg a clinical trial in pressure ulcers. We need to be sure that the use of sugar is an independent effective adjunct to treatment and that case reports are not simply reflecting excellence of nursing care. What will happen if it really is shown to work?