

# Self-care in the self-harm population: positive patient outcomes utilising innovative topical haemoglobin therapy

## KEY WORDS

- ▶ Haemoglobin spray
- ▶ Patient experience
- ▶ Self-care
- ▶ Self-harm
- ▶ Topical oxygenation therapy

Patients who self-harm require time and resources to enable satisfactory levels of care provision due to the complexity of their physical and psychological care needs. Method: A descriptive evaluation was undertaken in a community setting, exploring 20 patients who presented with chronic/acute wounds from self-harm. They consented to independently self-care for their wounds with twice-weekly topical haemoglobin therapy over a 4-week period. A healthcare worker provided standard wound cleansing and dressing regimens, which were continued by the patients. Data was collected weekly in relation to primary outcomes of patient ease of self-care use and overall product experience. Results: All patients found the product easy/satisfactory to use (100%,  $n=20$ ), promoting the self-care concept, and all stated they had a positive wound care experience. Conclusion: The administration of a haemoglobin spray solution in a small cohort of patients presenting with wounds as a result of self-harm behaviours resulted in positive outcomes of self-care and product satisfaction. Further evaluation and data analysis are proposed in this unique group of patients to examine their ability to carry out self-care and experience a positive wound care journey.

Self-care is becoming a priority in healthcare, with many product evaluations, service developments and government policy documents ensuring its fundamental place within current and future care provision (Hunt, 2015).

This paper explores the use of Granulox® (Infirst Healthcare), a haemoglobin spray product, in patients who attend a GP or walk-in clinic with chronic/acute wounds as a result of self-harm behaviours and who are able to consent to self-care. The primary outcome set is those of patient ease of self-care use and overall product experience. All patients were observationally supported by an expert wound care clinician on a weekly basis.

## SELF-CARE

Engaging patients with their own care is imperative to manage increasing NHS costs. The concept of self care is becoming a reality and wound care is no exception (Bateman, 2015a). The concept of self-care is broad and fully encompasses all aspects of patients improving and maintaining

good health, reducing harmful lifestyle choices, as well as ensuring patients are educated and taught skills to enable self-management of illness.

Self-care is a viable, achievable and a productive way to facilitate healthcare provision for patients with acute and chronic wounds (Bateman, 2015a). Patients require communication, education, observational support, clear objective agreement from the onset and reassurance alongside care innovation to ensure success (NHS England, 2014). Dowsett (2015) and Bateman (2015a) encourage choosing therapies that are easy to use. Self-care is not suitable for all patients and some may be excluded due to physical, psychological, financial or social reasons.

## SELF-HARM

Dallam (1997) describes self-harm as 'a complex group of behaviors resulting in the deliberate destruction of body tissue without conscious suicidal intent, with a pattern of a period of pent up negative feelings resulting in individual depersonalization, followed by relaxation and

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## Box 1. Signs of self-harm

- ▶▶ Unexplained cuts, bruises or cigarette burns, usually to wrists, arms, thighs and chest
- ▶▶ Keeping areas of skin covered at all times, even in hot weather
- ▶▶ Signs of depressive illness such as low mood, tearfulness or lack of motivation and interest in normal activities
- ▶▶ Self-loathing and expressing a wish to punish themselves
- ▶▶ Not wanting to go on and expressing a desire to end it all
- ▶▶ Becoming withdrawn and not speaking to others, isolating themselves
- ▶▶ Changes in eating habits, being secretive about eating with unusual weight gain or loss
- ▶▶ Signs of low self-esteem, blaming themselves for any problems or thinking they are not good enough for something
- ▶▶ Signs of pulling out their hair, skin conditions of the scalp, thinning hair, bald patches
- ▶▶ Signs of alcohol and/or drug abuse.

Adapted from NHS Choices (2016)

repersonalization post self-harm activity'. Self-harm remains a largely taboo subject (Kilroy-Findley, 2015). Determining the incidence of self-harm is difficult due to the secretive nature of the wounding (damage can be attributed to other more 'acceptable' wounds, eg burns can be attributed to accidents, bruising and contusions from hitting a wall can be attributed to accidental falls), the complex underlying mental health components, and under reporting (Dallam, 1997).

There are many different ways that people can intentionally harm themselves — cutting or burning their skin, punching or hitting themselves, poisoning themselves with toxic chemicals or medication, misusing alcohol and drugs, starving or binge eating, and excessive exercising (NHS Choices, 2016). Signs of possible self-harm are indicated in *Box 1*.

People often try to keep self-harming secret due to shame or fear of discovery. They may self-harm to help them cope with overwhelming emotional issues, which can be caused by social problems such as bullying, difficult relationships, physical or sexual abuse, bereavement, or psychological illness. Self-harm occurs when emotional feelings and sensations escalate and the person is unable to cope with their experience. By harming their body, these activities aid in release of stored up feelings. These unwanted feelings often relate to anger, guilt, frustration, hopelessness and self-hatred.

Selfharm UK (2016) estimates that around 13% of young people aged 11–16 self-harm at some point. There was a 70% increase in 10–14-year-olds attending A&E for self-harm related injuries in 2014 compared to the preceding 2 years

(Selfharm UK, 2016). Females are more likely to self-harm than males, but this may be an incorrect assumption, as males are more likely to carry out 'accepted' behaviours, such as punching walls, which is not always recognised as self-harm. NICE (2011) estimates that self-harm costs the NHS from £204 to £4,231 per hospital admission, depending upon the level of injury and complications.

There are many support groups and services providing social, psychological and physical help to the patient, and also wound care advice. The main focus with this patient group is to allow individuals to self-care for their wounds, ensure physical safety and to concentrate resources on the underlying emotional cause. Clinicians must not regard patients as time wasters and offer non-judgemental verbal and written support (Dallam, 1997; Kilroy-Findley, 2015). The key message is to focus upon appropriate assessment, identification of illness, awareness of when our patients need help and provide that timely support, the goal is to ensure our patients feel they are being listened to and understood (Selfharm UK, 2016). Kilroy-Findley (2015) emphasises the importance of addressing the underlying cause of self-harm, managing self-harm outcomes, empowering patients to be at the heart of all interventions and providing knowledge tailored to their individual needs.

## OXYGEN AND WOUND HEALING

Wounds caused by self-harm cannot progress to full healing without an adequate oxygen supply, like any wound type (Flanagan, 2000; Norris, 2014; Chadwick et al, 2015). Humans have no capacity to retain or store oxygen and therefore require a steady supply to the cells for tissue regeneration (Timmons, 2006; Chadwick et al, 2015).

When human cells are systemically depleted of oxygen, developing tissue cells can become inactive and dysfunctional, which has a negative impact on healing, with the wound becoming static, necrotic and sloughy (Dow, 2001). Therefore adequate tissue oxygenation is paramount for wound healing.

Topical delivery of oxygen direct to the wound bed through solution mediums or hyperbaric mechanisms provide positive benefits within both chronic and acute wounds (Ladizinsky et al, 2010; Norris, 2014; Winfeld, 2014; Bateman, 2015a, 2015b; Hunt, 2015; Tickle, 2015).

The application of topical oxygen therapy allows haemoglobin-mediated oxygen diffusion within the wound bed through an aqueous solution that positively aids the wound healing process through an increased uptake of oxygen (Arenbergerova et al, 2013; Babadagi-Hardt et al, 2014).

**GRANULOX**

Granulox is a mechanical topical therapy containing an oxygen-haemoglobin medium derived from sterile porcine, which is recommended for both acute and chronic wounds within all common wound groups. It facilitates the diffusion of released oxygen from the atmosphere into the wound bed tissues via a spray mechanism that is simple and easy to use from various positional angles. A number of authors have highlighted the benefits of wound tissue oxygenation through the process of diffusion, with positive outcomes of wound healing (reduction) through using topical haemoglobin therapy (Green and Mohamud, 2014; Norris, 2014; Bateman, 2015a, 2015b; Hunt, 2015, 2016; Tickle, 2015).

The treatment requires little education and training for its use, has had no negative side effects to date and has been used by clinicians, allied healthcare professionals, patients and carers with no adverse events (Bateman, 2015a, 2015b; Hunt, 2015; Tickle, 2015). The product is approved for use as a non-wound contact spray, to be applied at least every 72 hours on all wounds deemed chronic (Arenbergerova et al, 2013). It is acknowledged by an expert wound care working group that the optimum application rates and long term benefits are not evidenced as yet, although work is ongoing (Chadwick et al, 2015).

Infirst Healthcare guidelines specify that Granulox is not recommended for use with certain disinfectants, proteolysis or mechanical debridement as these may reduce its impact. The therapy is to be avoided on tissue where diagnosed infection is present and in pregnant/lactating patients, due to the absence no available significant of safety data in these patient groups being available. Infirst Healthcare states that wounds should be clean with no devitalised tissue present before product application occurs. The product requires a cool storage temperature (2–8 °C). Granulox is an adjunct to wound care management as part of a holistic approach to care.

Studies demonstrating positive outcomes are available. Topical haemoglobin oxygenation of common chronic wounds and chronic leg ulcers was explored by Arenberger et al (2011) and Arenbergerova et al (2013), respectively, while Babadagi-Hardt et al (2014) investigated chronic wounds/compression and Budd-Chiari syndrome and recent clinical pilots include using topical haemoglobin spray therapy on leg ulcers and pressure ulcers (Norris, 2014; Tickle, 2015). These studies demonstrate the positive outcomes of increased healing potential, wound reduction and no negative adverse reactions.

Recent evaluation work carried out by Bateman (2015b) and 12 week follow-up by Hunt et al (2016) on diabetic foot ulcers and Bateman (2015a) on sloughy wounds support the current evidence with new outcomes of slough reduction, pain reduction, positive patient education, wound care experience and the promotion of patient/carer self-care.

**AIM**

This study aims to explore Granulox use in patients who self-harm, to ascertain its ease of use and its impact upon their wound care journey experience and satisfaction. This area of impact is not currently available within the topical haemoglobin oxygenation literature. The primary outcomes were patient ease of use (self-care) and overall product experience.

**METHODS**

Study subjects were recruited at a single community GP/walk in centre. Patients who presented with wounds that were as a result of self-harm behaviour

Table 1. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> <li>▶▶ Presented with a wound as a result of self-harm behaviour</li> <li>▶▶ Patient gave verbal consent for 4 weeks Granulox therapy in clinic and home setting</li> <li>▶▶ Patient able to demonstrate appropriate use of Granulox spray device.</li> </ul>	<ul style="list-style-type: none"> <li>▶▶ Other wound group not as a result of self-harm behaviour</li> <li>▶▶ Patient declined verbal consent</li> <li>▶▶ Patient unable to use Granulox spray device.</li> </ul>

were assessed against the inclusion criteria (Table 1) and invited to participate. Five patients declined to participate in the evaluation due to history of non-attendance at appointments ( $n=3$ ), wishing to continue with healthcare input on wound dressing ( $n=1$ ) and out of area attender ( $n=1$ ). Patient individual wound status and demographic details are summarised in Table 2.

The patients self-applied Granulox to the wound bed twice a week alongside their normal cleansing and dressing regimen over a 4-week period. The author showed them how to cleanse and dress their wounds, provided the product information leaflet and explained red flags such as malodor, excessive exudate, increased pain, change in wound bed colour and tissue consistency. Patients were advised to seek earlier review if they had any concerns, as is normal surgery practice.

During the 4-week evaluation period, each patient received the same care with which they entered the evaluation. The only variable was the addition of the haemoglobin product. Pre-evaluation care included

soft silicone foams (adhesive/non-adhesive) hydrofiber adhesive foams, basic adhesive plasters and retention bandages.

The outcome data was collated at week 2 and week 4 of the evaluation via a set questionnaire using a Likert scale. Each patient was asked 'how easy/acceptable is the product to use?' (1=very difficult to 4=easy) and 'what is your overall experience of the product?' (1=poor to 4=excellent).

The author carried out weekly observations at clinic dressing change and cross-checked all data for accuracy. Other data was collected, including wound reduction, slough reduction and pain scores, but these are not addressed within this paper due to ongoing analysis for future publication.

**RESULTS**

All patients (100%,  $n=20$ ) were able to apply the Granulox therapy independently at the clinic review appointments and within their own living environments. All patients self-managed,

Table 2. Patient demographics

Patient/gender/age	Self-harm method	Wound location	Wound duration	Primary cause	Healthcare provider and frequency
1/F/33	Pen knife	Left arm	2 weeks	Heroin addiction	Practice nurse 2 days
2/F/19	Table fork	Right groin	1 week	Opioid addiction	Practice nurse 1 day
3/M/25	Hunting knife	Left arm/thigh	2 weeks	Heroin addiction	Nurse practitioner 1 day
4/M/19	Razor blade	Bilateral groins	2 weeks	Depression	Practice nurse 2 days
5/F/39	Razor blade	Posterior right knee	3 weeks	Bipolar type 2	Nurse practitioner 3 days
6/F/40	Survival knife	Left wrist (failed suicide)	2 weeks	Depression	District nurse 3 days
7/M/31	Large needle	Left groin	2 weeks	Cocaine addiction	District nurse 2 days
8/M/29	Knitting needle	Left upper thigh	1 week	Depression	District nurse 2 days
9/M/21	Pen knife	Right mid tibial crest	1 week	Personality disorder	District nurse 2 days
10/M/20	Large needle	Right mid tibial crest	7 weeks	Opioid addiction	Nurse practitioner 3 days
11/M/26	Survival knife	Right mid tibial crest	56 weeks	Heroin addiction	Practice nurse 3 days
12/F/18	Screw driver	Right groin	4 weeks	Heroin addiction	Practice nurse 2 days
13/M/33	Kitchen knife	Left forearm	6 weeks	Schizophrenia	District nurse 3 days
14/F/29	Bread knife	Left thigh (failed suicide)	2 weeks	Anxiety/depression	District nurse 3 days
15/F/20	Glass bottle	Right palm of hand	5 weeks	Personality disorder	Practice nurse 2 days
16/F/25	Pen knife	Posterior right knee	5 weeks	Cocaine addiction	Practice nurse 2 days
17/F/25	Stanley knife	Left axilla	4 weeks	Anxiety/depression	District nurse 2 days
18/M/22	Large needle	Right groin	8 weeks	Opioid addiction	District nurse 3 days
19/F/18	Iron burn	Left abdomen	2 weeks	Anxiety disorder	Practice nurse 4 days
20/F/54	Bleach injection	Left lower tibial crest	1 week	Schizophrenia	Nurse practitioner 6 days

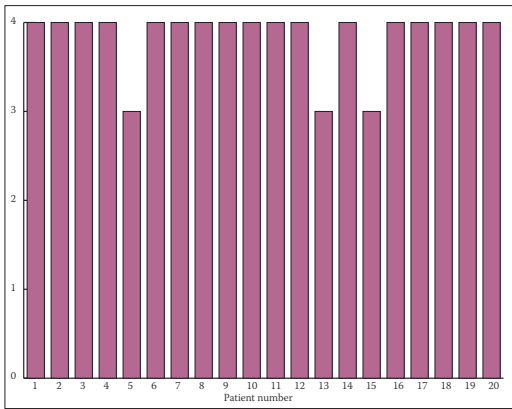


Figure 1. Patient response to the question ‘how easy/ acceptable is the product to use?’. Key: 1= very difficult, 2= difficult, 3= manageable, 4= easy

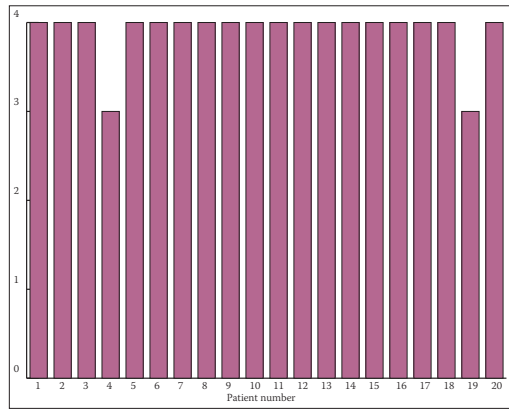


Figure 2. Patient response to the question ‘what is your overall experience of the product?’. Key: 1= very difficult, 2= difficult, 3= manageable, 4= easy

with only verbal, educational and observational support from the wound care expert leading the clinic appointments and data collection. Prior to the evaluation, no patients carried out their own wound care and had all relied on healthcare workers to do this at regular intervals ranging from 1 to 4 days.

When asked ‘how easy/acceptable is the product to use?’, 85% ( $n=17$ ) said it was easy and 15% ( $n=3$ ) manageable (Figure 1). This level of satisfaction replicates the previous experience of patients with diabetic foot ulcers and sloughy wounds using Granulox, and emphasises the ease in which patients can administer their own therapy with minimal or no supervision (Bateman, 2015a, 2015b; Hunt, 2015).

When asked ‘what is your overall experience of the product?’, 90% ( $n=18$ ) found the experience excellent and 10% ( $n=2$ ) deemed it good (Figure 2). Again this result replicates previous work (Bateman, 2015a, 2015b; Hunt, 2015). All ( $n=20$ ) the patients welcomed the product instruction leaflet and found it informative and helpful, particularly when independently using the product at home. All of the patients and carer praised the product and wished to continue with it throughout the four week evaluation period and thereafter depending upon their wound healing needs.

There were no reports of adverse events. None of the patients reported any increase in irritation or skin reactions to the product. There were no declines in consent due to cultural, religious or vegetarian preferences.

There were no patient drop outs during the 4-week evaluation. The data was collected and cross checked by the author. This evaluation data expands upon the increasing positive patient experience and ability to self-care outcomes within current available literature for the use of topical haemoglobin spray within the community setting.

**LIMITATIONS**

The cohort was a small sample of self-harming patients. Patients with a wider range of mental health issues were not represented. Although benefits were seen in this 4-week period of treatment with Granulox, the product’s effects over a longer period of time were not examined.

**CASE HISTORIES**

Patient 8 is a 29-year-old male. He has had chronic depressive illness since the age of 15 following the death of both parents within 3 months of each other. He resided in a care facility until he turned 18. He has self-harmed since the age of 16 and normally uses sharp, clean instruments from home on his upper thighs so that the scars and wounds can be hidden from others. He attended the walk-in centre due to excessive bleeding from left upper thigh and had been seeing district nurses every 2 days until severe bleeding occurred. Wound depth is 7 cm (Figure 3).

Patient 19 is 18 years old with anxiety disorder. She lived in an environment with domestic violence for 3 years until she was relocated to an out-of-area safe house and accommodation at

age 15. She has a social worker and community psychiatric nurse care package. She used a hot electric iron to burn a tattoo on her left abdomen (Figure 4). Two weeks later, she presented at the GP with pain, malodor and excessive exudate. She had already seen practice nurses at two local walk-in centres.

Both patients felt using the product was simple and liked the privacy of self-care at home. Their wound healing progressed normally, with reduced pain levels, thus promoting increased acceptability of the product use and positive wound care journey.

**CONCLUSION**

Self-harm tissue destruction is seen frequently in community and acute settings. Patient attendance at GP, walk-in centres and A&E is on the increase. Due to the tendency of patients to be secretive about this condition, the true impact upon the healthcare system is not fully known.

Patients who self-harm seek clinical support when they are not able to manage their own wounds or are unable to cope with their underlying aetiologies. Those patients who carry out self-harm with resulting tissue destruction require clinicians to supply timely assessment, self-care support, education and guidance, alongside building trusting relationships if care outcomes are to be successful.

The implementation of innovative, easy-to-use and effective products in managing wounds are essential in today's complex wound care arena. This small but important evaluation has studied the use of Granulox in patients who self-harm, with positive results for self-management of wounds and a good wound care experience.



Figure 3. Patient 8's wound was 7 cm deep and caused by a knitting needle

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Figure 4. Patient 19 used a hot iron to burn a tattoo on her left abdomen

**Declaration of interest**

All products for the evaluation were provided by Infirst Healthcare, which did not have any control over or involvement within this data or any previous data collections, analysis or article submissions.