

SKIN CARE

Contents

SKIN CARE	2
CLEANSING	2
WOUND CLEANSING CONSIDERATIONS:	2
SOLUTIONS FOR USE IN WOUND CLEANSING	3
IRRIGATION PRESSURES APPROPRIATE FOR WOUND CLEANSING	5
IRRIGATION TEMPERATURE	5
EMOLLIENTS	5
DONNING AND DOFFING AIDS	6
REFERENCES	12

Skin Care

Cleansing

The purpose of wound cleaning is to remove debris from the wound and surrounding skin to minimize the impact of that debris on healing. There are some general principles that can be applied to all situations, however each wound needs to be assessed individually to create a suitable wound cleaning plan. For example, a skin tear that was cleaned, edges re-opposed and dressed 2 days ago. You lift the edge of the silicone dressing and there is no exudate, the skin is clean, dry and pink. Do you clean it? I would not. The risk of disturbing the delicate skin outweighs the benefit of cleaning. What about the arterial heel or toe wound? The person has no ability to heel this (or very limited). Do you clean it? If it is dry necrotic material I would really hesitate to get it wet. What about the fungating tumour? High risk of bleeding but countering that is the high risk of infection ... it is about assessing the risks and working out a plan with the treatment team, the patient and their family/carer that is best for the patient.

Generally speaking, there are a number of things to do to minimize infection when interacting with a wound. Most recently the aseptic non-touch technique (ANTT) has been promoted as current best practice. Some key points⁽²⁾ are:

- Wash your hands! This can be washing with soap and water or using alcohol hand rubs. Before donning gloves, before and after touching a patient or a patient's surroundings, and after doffing gloves.
- Understanding key parts and key sites and protecting these from being contaminated. Clean your field (this is both the patient and where your equipment/supplies are kept), minimize distances (have everything prepared and close if possible), keep an eye on your field (the number of times the patient has tried to touch their wound to point out something, or placed their phone/wallet/glasses on my field!!!)
- Use personal protective equipment (PPE) appropriately. I can go through 6-8 gloves per patient and I always wear an apron. I consider my patient cohort to all have some form of resistant community acquired bacteria due to the long-term nature of their wounds.
- Manage your waste disposal. Follow the policy for waste in your facility.

A copy of the ANTT can be seen in Appendix A.

Gloves: sterile, non-sterile or none? The only place (in my opinion) you could possibly not wear gloves is when setting up the field. This assumes you have washed your hands thoroughly beforehand. But I tend to wear gloves for this as well. When interacting with the skin and the wound, this is a judgment call. A systematic review of cutaneous and dental surgical procedures showed no significant difference between using clean or sterile gloves⁽³⁾. However, assess the individual and the situation. Are they at higher risk for infection? Are you reaching into a body cavity? Is bone or are other internal structures exposed?

Wound Cleansing Considerations:

- Prior to cleaning the wound ensure the patient has suitable pain relief if required. Wash your hands! Prepare everything you need in advance and don appropriate PPE. Check your surroundings for adequate lighting, protection of surfaces/things you don't want to get wet, patient comfort and privacy.
- During wound cleaning ensure you assess your patient's comfort/pain level regularly. Some techniques and some cleansers can cause discomfort; you may need to change your

plan. Also look after your own comfort and positioning to ensure you do not cause harm to yourself. Not only look at cleaning the wound but also ensure the region the wound is in is also thoroughly cleaned. This is particularly true for toes on the feet of legs that wear compression. These feet and toes remain covered most of the time and do not get exposed to regular cleaning.

- After cleaning gently pat the skin and wound dry, do not rub. I prefer to use the disposable drying towel that comes packed in the basic dressing kits for drying the wound. Apply moisturizer and dress wound as per the plan (remember, adhesive dressings do not like to stick to recently moisturized skin!). Dispose of anything that was used in the procedure (washcloths, towels, underpads, PPE, dressing kits and drapes, etc...) appropriately. Wash your hands!

Solutions for use in wound cleansing

Potable tap water. This is water that has been deemed suitable for drinking. Potable tap water can be used on adults and children with acute or chronic wounds⁽⁴⁾. If potable water is not available boiled and cooled water is an acceptable substitute⁽²⁾. Potable water has been shown to be cost effective, readily available and not cause harm or increase the risk of infection in these wounds⁽⁵⁾. However, by itself, it is also not able to interrupt biofilm and *Pseudomonas aeruginosa* is known to colonise wet areas (taps and pipes)⁽⁶⁾.

Normal saline. This is available as a 0.9% solution of sodium chloride in water. This may be needed for patients where potable water is deemed unsuitable. Normal saline has been shown to not harm healing wound tissues. However it has no effect on biofilm⁽¹⁾ and bacterial growth can occur in an open container within 24 hours⁽⁶⁾.

Prontosan. This is a solution of 0.1% Polyhexamethylene biguanide (PHMB), an antimicrobial agent and 0.1% Betaine, a surfactant. Hypersensitivity is rare but possible so should only be used on patients who have not shown a previous sensitivity to the product⁽²⁾. The solution's surfactant component has been shown to penetrate difficult to remove coating, breaking up biofilm and suspending it in solution to prevent re-contamination⁽⁶⁾. In order for the antimicrobial component to be effective the product must be in contact with the wound for at least 15 minutes⁽⁵⁾. PHMB's mechanism of action also means it has a low risk of developing resistances⁽⁷⁾.



Povidone-Iodine. This has been known to show toxicity to healthy cells in high concentrations and longer duration of contact but has shown efficacy against biofilms with reduced concentrations (1%w/v available iodine) and 15-minute exposure time. It is recommended to rinse the product off after use⁽¹⁾. There have also been reports of renal and thyroid dysfunction where there have been large absorption sites and prolonged use⁽²⁾.

Acetic Acid (Vinegar). There is very little in the modern literature that discusses the use of vinegar in wound cleansing. A 1% solution has been shown to reduce *Pseudomonas aeruginosa* colonization better than normal saline⁽⁸⁾. It is not as effective against other bacteria⁽⁹⁾. But as anyone who has ever had fish-n-chips with finger cuts or cracked lips can attest to, at higher concentrations this stuff can really burn! Therefore preparation needs to be precise and

calculating exactly how much of the particular vinegar you have that you need to make a 1% solution is adding in a possible step for mistakes.

Potassium Permanganate (Condies Crystals). Again, there is little research supporting the use of Potassium Permanganate in wound management but anecdotally it has been used to manage weeping or blistering conditions such as acute weeping/infected eczema and leg ulcers. However the NHS commissioned a study (“What is the evidence for the use of potassium permanganate preparations?”) in 2019 that found no statistically significant support for its use. DermNet NZ describes its use in “wet” skin conditions at a dilution of 1 in 10,000 and as a 1% (1 in a 100) solution when managing fungal infections such as athlete's foot⁽¹⁰⁾. But at higher concentrations the solution is caustic and can burn the skin. It can also cause irritations at lower concentrations with repeated use.

Potassium permanganate



Crystals

Concentrated solution

Therapeutic solution

Figure 1 - from Dermnet.NZ⁽¹⁰⁾

Hydrogen Peroxide. H_2O_2 is a naturally occurring chemical in the body that has a great influence on wound healing. The concentrations of H_2O_2 change throughout the different stages of wound healing, changing its role at each stage. In high concentrations it is pro-inflammatory and at low concentrations it promotes the secretion of cytokines that help with tissue regeneration⁽¹¹⁾. We don't really know how exogenous sources of H_2O_2 impact on wound healing, but it still appears widely used in surgical procedures, particularly in the UK. However, its efficacy is questionable and it is known to have reduced antimicrobial efficacy in the presence of organic matter (such as proteins/blood)⁽¹²⁾. It is also known to be cytotoxic, to the extent that it was once recommended as a form of cancer treatment for killing solid tumours⁽¹³⁾.

Hypochlorous Acid. This appears to be gaining momentum again in the wound world despite it being quite cytotoxic. However the version used in wound cleansing is around 0.01% and is considered safe to use with rapid and broad antimicrobial efficacy⁽⁶⁾. It is also thought to impact on biofilms⁽¹⁴⁾. A 15 minute exposure is said to be effective against gram negative bacteria and can also help to facilitate the separation of non-viable tissues⁽¹⁾.

Chlorhexidine. Resistances to Chlorhexidine have now been found in *Proteus Mirabilis*, *Pseudomonas* sp. and *S. Aureus*. In rare cases it can also cause anaphylaxis⁽²⁾. Chlorhexidine comes in different concentrations and formulations for different applications such as skin preparation and wound irrigation. However the wound irrigation concentrations have not been found to increase wound healing rates and other, safer, solutions should be considered⁽¹⁵⁾.

Irrigation pressures appropriate for wound cleansing

Showering. Shower pressure is sufficient to dislodge surface debris and can be used in conjunction with disposable washcloths to provide additional mechanical force. Showering may also give patients a feeling of well-being and cleanliness. Consideration needs to be given to the quality of the water and the possibility of bacterial contamination of the shower, taps and pipes.

Irrigation. 15 PSI of pressure is achievable by using a 20ml syringe with a 20g cannula. This level of pressure has been shown to dislodge bacteria on the wound. Lower pressures can be used to provide wound cleaning for granulating tissues⁽¹⁾. The use of sterile gauze squares may provide additional mechanical force if needed.

Syringe MLs	Needle/angio gauge	PSI
35	25	4
35	21	6
35	19	8
20	18	12
12	22	13
12	19	20
6	19	30

Soaking. Soaking is used where surfactants are involved and it allows the product time to break up the biofilm. Irrigate the wound first to remove loose debris, then apply the solution to a sterile gauze and place in the wound bed. Leave in place for 15 minutes⁽⁵⁾. The wound may also be cleaned with soaked sterile gauze squares to provide additional mechanical force if needed.

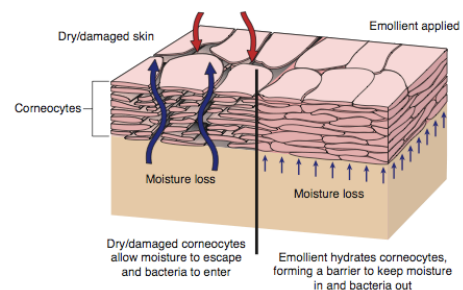
Figure 2 - "From Ten top tips: wound cleansing"⁽¹⁾

Irrigation Temperature

Cellular activity decreases with decreasing temperature. This means that every time we interact with a wound (expose it to air, wash it, leave it uncovered awaiting doctor review or community nurse visit ...) we slow down the healing. Warming solutions and keeping wounds covered/not disturbed as long as possible assist to keep the cellular activity unimpeded⁽¹⁾. Ensure that you read the instructions on the solutions you are using as some may be more irritating if warmed or may reduce their shelf-life.

Emollients

An emollient is an oil suspended in an emulsion that will put an occlusive coating on the skin⁽¹⁶⁾. The purpose of emollients is to improve the moisture retaining capability of the skin. The barrier function of the skin relies on a well-hydrated epidermis. It is also this level of moisture in the stratum corneum that helps to regulate the pliability and elasticity of the skin⁽¹⁷⁾.



The degree to which the emollient traps moisture to the skin varies with the composition of the product. Generally speaking moisture retention increases with density: Oils < Lotions < Creams < Ointments^(16, 18).

The use of emollients is most effective after bathing⁽¹⁶⁾ and it is recommended that they be applied in the direction of the hair follicles and as often as needed to keep the skin well hydrated⁽¹⁸⁾.

There can be adverse effects related to the use of emollients. Contact allergies are rare but may be related to something like a preservative or fragrance. Patch testing can be used on sensitive patients or if you have any concerns. The more highly occlusive emollients can cause or aggravate folliculitis. And the presence of paraffin-containing ointments on clothing or bedding can be a fire hazard if exposed to cigarettes or a lighted fire^(16, 19). Where these products have spilled onto the floor it can also be a slip hazard⁽¹⁸⁾.

Donning and Doffing Aids

Compression garments can be difficult to get on and difficult to get off. Lower leg ulcers occur more often in patients over 65 years of age and strength and dexterity in this age group will impact on the ability to put garments on or take them off. This is well known and there is a wide selection of devices that can assist with donning and doffing, a few of which are listed here.



Image	Style	Benefits	Considerations
	Slider or slide sheet style. For donning	<ul style="list-style-type: none"> • Inexpensive • Helps slide stocking over the heel • The way that the material slides over itself ensures there is no pulling or tearing of the skin when removing the slider (unlike when using a plastic bag) 	<ul style="list-style-type: none"> • Must be able to reach the feet • still requires strength • only for open-toe garments
	Slider style with magnets (for closed toe garments) For donning	<ul style="list-style-type: none"> • Magnets are used to hold the slider in place then unlock to remove it. • Sliding back over itself reduces the risk of damage to delicate skin 	<ul style="list-style-type: none"> • Must be able to reach the feet • still requires strength • can be difficult to get the magnets to release (takes practice)




Image	Style	Benefits	Considerations
	<p>Plastic support frame</p> <p>For donning</p>	<ul style="list-style-type: none"> • Stocking is put on the frame from a position of strength and comfort. • Range of accessories to allow for reduced dexterity • Range of sizes to minimize garment stretching • Good for maintaining independence 	<ul style="list-style-type: none"> • Can be a falls risk depending on donning technique • Lack of ankle movement (to point toes down) can cause the foot to get caught
	<p>Metal support frame</p> <p>For donning</p>	<ul style="list-style-type: none"> • Stocking is put on the frame from a position of strength and comfort. • Good for maintaining independence 	<ul style="list-style-type: none"> • Can be a falls risk depending on donning technique • Lack of ankle movement (to point toes down) can cause the foot to get caught
	<p>Bubble</p> <p>For donning and doffing</p>	<ul style="list-style-type: none"> • Does not stretch the garment • Does not pull on the skin at any time 	<ul style="list-style-type: none"> • Takes some practice • Very difficult for an individual but excellent for a carer

Image	Style	Benefits	Considerations
	<p>Plastic frame with doffing aid</p> <p>For donning and doffing</p>	<ul style="list-style-type: none"> • Stocking is put on the frame from a position of strength and comfort. • Good for maintaining independence • Extra doffing ring to assist with garment removal 	<ul style="list-style-type: none"> • Takes some practice • Lack of ankle movement (to point toes down) can cause the foot to get caught
	<p>Doffing aid</p>	<p>Assists in the removal of garments.</p>	<p>Useful for removing lighter garments. Will eventually break with enough pressure or used on too much of an angle. At which point it becomes a potential skin damage risk.</p>

Appendices



Simple Wound Care using Standard-ANTT

for the ANTT Practice Framework see: www.antt.org

Preparation zone	<p>1  Clean hands with alcohol hand rub or soap & water</p>	<p>2  Clean trolley & tray according to local policy creating a Main General Aseptic Field</p>	<p>3  Gather supplies & place on bottom shelf of trolley</p>	Patient zone	<p>4  Apply apron & clean hands</p>	<p>5  Apply non-sterilized gloves</p>	<p>6  Remove dressing using non-touch technique (NTT)</p>
Decontamination Zone	<p>7  Dispose of dressing</p>	<p>8  Dispose of gloves</p>	<p>9  Clean hands with alcohol hand rub or soap & water</p>	<p>10  Open supplies Protect within Micro Critical Aseptic Fields & NTT – on a General Aseptic Field</p>	<p>11  Apply non-sterilized gloves & assemble equipment using NTT</p>	<p>12  Clean wound using NTT</p>	<p>13  Dress wound using NTT</p>
Decontamination Zone	<p>14  Dispose of equipment waste & gloves then apron & immediately...</p>	<p>15  Clean hands with alcohol hand rub or soap & water</p>	<p>16  Clean tray & trolley according to local policy</p>	<p>17  Clean hands with alcohol hand rub or soap & water</p>	Your Hospital Logo Here		



ANTT
Aseptic Non-Touch Technique

Complex Wound Care
using Surgical-ANTT

for the ANTT Practice Framework see: www.antt.org

Preparation zone

1



Clean hands with alcohol hand rub or soap & water

2



Clean trolley according to local policy

3



Gather dressing pack & equipment & place on bottom shelf

Patient zone

4



Apply apron & clean hands

5



Open Critical Aseptic Field (sterilized drape) using NTT

6



Open equipment using NTT

7



Apply non-sterilized gloves

8



Place sterilized drape under the wound

9



Remove dressing using NTT & dispose of dressing in waste bag

10



Dispose of gloves

11



Clean hands with alcohol hand rub or soap & water

12



Apply sterilized gloves

13



Clean wound using NTT

14



Dress wound using NTT

15



Dispose of equipment, waste, gloves & apron, then...

Decontamination zone

16



Clean hands with alcohol hand rub or soap & water

17



Clean trolley according to local policy

18



Clean hands with alcohol hand rub or soap & water

Your Hospital Logo Here

ANTT © 2017-2020

References

1. Weir, D. and T. Swanson, *Ten top tips: wound cleansing*. Wounds International, 2019. **10**(4): p. 8-11.
2. Nolan, M., *HSE National Wound Management Guidelines 2018*, T.O.o.N.a.M.S. Director, Editor 2018: Dublin, Ireland.
3. Brewer, J.D., et al., *Comparison of Sterile vs Nonsterile Gloves in Cutaneous Surgery and Common Outpatient Dental Procedures: A Systematic Review and Meta-analysis*. JAMA Dermatology, 2016. **152**(9): p. 1008-1014.
4. Fernandez, R. and R. Griffiths, *Water for wound cleansing*. Cochrane Database of Systematic Reviews, 2012(2).
5. Mahoney, K., *Part 2: Wound cleansing and debridement*. Journal of Community Nursing, 2020. **34**(3): p. 26-32.
6. Wolcott, R. and J. Fletcher, *The role of wound cleansing in the management of wounds*. Wounds International, 2014. **5**(3): p. 25-30.
7. Worsley, A., et al., *Polyhexamethylene Biguanide:Polyurethane Blend Nanofibrous Membranes for Wound Infection Control*. Polymers, 2019. **11**(5): p. 915.
8. Madhusudhan, V.L., *Efficacy of 1% acetic acid in the treatment of chronic wounds infected with Pseudomonas aeruginosa: prospective randomised controlled clinical trial*. International Wound Journal, 2016. **13**(6): p. 1129-1136.
9. Kumara, D.U.A., et al., *Evaluation of bactericidal effect of three antiseptics on bacteria isolated from wounds*. Journal of Wound Care, 2015. **24**(1): p. 5-10.
10. "Potassium Permanganate". Dermnet NZ 2016 [cited 2016, September 4]; Available from: <http://www.dermnetnz.org/topics/potassium-permanganate/>.
11. Zhu, G., et al., *Hydrogen Peroxide: A Potential Wound Therapeutic Target?* Medical Principles & Practice, 2017. **26**(4): p. 301-308.
12. Roth, B., et al., *Effect of antiseptic irrigation on infection rates of traumatic soft tissue wounds: a longitudinal cohort study*. Journal of wound care, 2017. **26**(3): p. 79-87.
13. Symons, M.C.R., et al., *Hydrogen peroxide: a potent cytotoxic agent effective in causing cellular damage and used in the possible treatment for certain tumours*. Medical hypotheses, 2001. **57**(1): p. 56-58.
14. International Wound Infection Institute, *Wound Infection in Clinical Practice: Principles of Best Practice*. Wounds International, 2016.
15. Wound Healing and Management Node Group, *Evidence Summary: Wound management - Chlorhexidine*. Wound Practice & Research, 2017. **25**(1): p. 49-51.
16. "Emollients and moisturisers". Dermnet NZ 2016 [cited 2021, August 19]; Available from: <https://dermnetnz.org/topics/emollients-and-moisturisers/>.
17. Watkins, P., *Using emollients to restore and maintain skin integrity*. Nursing Standard, 2008. **22**(41): p. 51-57.
18. Flavell, T., *Using soap substitutes, bath additives and leave-on emollients*. Journal of Community Nursing, 2016. **30**(3): p. 29-34.
19. Penzer-Hick, R., *Fire risks and skin creams: some history and an update*. Journal of Community Nursing, 2020. **34**(6): p. 14-14.