

Wound Management Formulary

*Produced by: The Joint Wound Management Formulary Group
in collaboration with:
NHS Calderdale
Calderdale and Huddersfield NHS Foundation Trust
NHS Kirklees
Locala Community Partnerships
The Mid Yorkshire Hospitals NHS Trust
Spectrum Community Health
NHS Wakefield District
South West Yorkshire Partnership NHS Foundation Trust*

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Contributors:

Organisation	Designation	Name
NHS Calderdale	Senior Pharmacist	Helen Foster
Calderdale and Huddersfield NHS Foundation Trust	Tissue Viability Specialist Nurse (TVN)	Helen Fearnley Linda Firth
	Principal Pharmacist - Medicines Information - Calderdale Royal Hospital	John Yorke
	Clinical Lead Podiatrist in Community Diabetes and Wound Care	Jane Findlater
	District Nurse	Caroline Bradbury
Locala Community Partnerships, and also representing NHS-Kirklees	Head of Medicines Management	Lucianne Ricketts
	District Nurses	Bev Greenbank Dora Collick
The Mid Yorkshire Hospitals NHS Trust	Tissue Viability Specialist Nurse (TVN) - Pinderfields Hospital	Lyn Wilson
	Tissue Viability Specialist Nurse (TVN) - Dewsbury District Hospital	Tracy Conroy
	Vascular Nurse Specialist - Pinderfields Hospital	Leanne Cook
	Tissue Viability Specialist Nurses (TVN)	Claire Brown Joanne Newbold
	Principal Pharmacist - Medicines Information - Pinderfields Hospital	Anne Fonseca
NHS Wakefield District	Medicines Management Specialist Pharmacy Technician	Kim Mooring

Contact Details for Clinical Advice and submission of Exception Reporting Forms:

Organisation	Designation	Name	Contact details
NHS - Calderdale	Tissue Viability Specialist Nurse	Helen Fearnley Linda Firth	01484- 355396 Fax 01484-347415
Calderdale and Huddersfield NHS Foundation Trust	Tissue Viability Specialist Nurse	Helen Fearnley Linda Firth	01484- 355396 Fax 01484-347415
	Principal Pharmacist - Medicines Information	John Yorke	01422-224356
	Clinical Lead Podiatrist for Community Diabetes and Wound Care	Jane Findlater	01422-305537
		Alison Williams	01484-344231
	Clinical Lead Podiatrist for Acute Diabetes and Wound Care	Gill Sykes	01484-355066
NHS - Kirklees	Greater Huddersfield Clinical Commissioning Group		
	Tissue Viability Specialist Nurse	Helen Fearnley Linda Firth	01484- 355396 Fax 01484-347415
	North Kirklees Clinical Commissioning Group		
	Tissue Viability Specialist Nurse	Tracy Conroy	01924-512092
Locala Community Partnerships	South Kirklees		
	Tissue Viability Specialist Nurse	Helen Fearnley Linda Firth	01484- 355396 Fax 01484-347415
	North Kirklees		
	Tissue Viability Specialist Nurse	Tracy Conroy	01924-512157
The Mid Yorkshire Hospitals NHS Trust	Tissue Viability Specialist Nurse - Pinderfields and Pontefract Hospitals	Lyn Wilson	01924-542097
	Tissue Viability Specialist Nurse - Dewsbury District Hospital	Tracy Conroy	01924-512157
	Vascular Nurse Specialist	Leanne Cook	01924-542473 leanne.cook@midyorks.nhs.uk
	Tissue Viability Specialist Nurse - Community	Claire Brown Joanne Newsome	01924-327591
	Principal Pharmacist - Medicines Information	Anne Fonseca	01924-541394
Spectrum Community Health	Senior Nurse Practitioner - Substance Misuse and Wellbing	Karen Jordan	01924-330500 karen.jordan@spectrum-cic.nhs.uk
NHS - Wakefield	Tissue Viability Specialist Nurse	Claire Brown Joanne Newsome	
Chair of Committee	Head of Medicines Management	Lucianne Ricketts	

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1. Introduction

Welcome to the wound management formulary. We hope you find it a helpful resource in your everyday practice.

The Joint Wound Management Formulary is available for all practitioners prescribing and/or applying wound care products throughout the acute and primary care trusts. There are some variations between acute and primary care provision of products dependent upon appropriateness and availability. The formulary has been devised by a panel of practitioners, who have specialist knowledge and expertise in wound management. It aims to provide a clinically effective, appropriate and cost effective choice of products to manage the vast majority of wounds and will be evaluated and updated on a two yearly basis.

All the dressings in this formulary are for general use, with the exception of those indicated for specialist prescribing. All new products need to be approved by, the Joint Wound Management Formulary Group, before being added to the formulary.

Treatment for patients should be based on the best evidence of what does and does not work and what provides the best value for money.

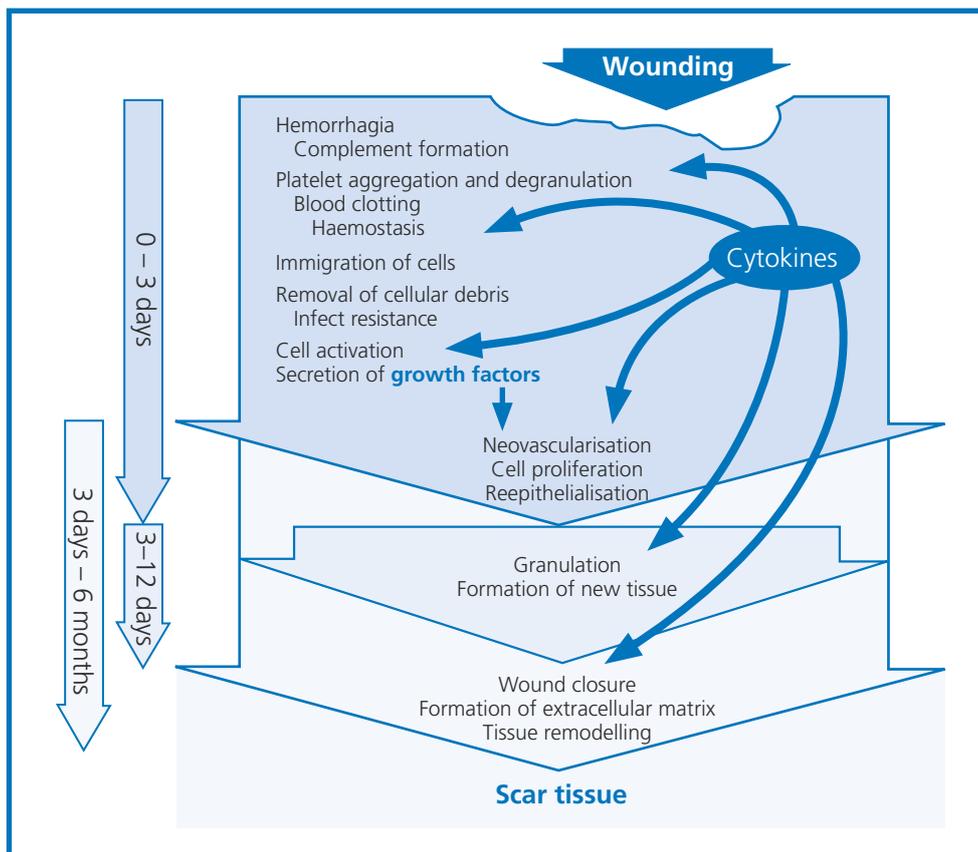
It must be emphasised that an holistic wound assessment must take place prior to choosing a dressing.

1.1 Notes for using the formulary

- The formulary should not be used in isolation and should not replace sound clinical judgment.
- Practitioners with specialist wound care knowledge in each Trust should be referred to if necessary.
- Specialist products listed should only be used following discussion with/assessment by designated wound care specialists.
- It is expected that the vast majority of wound care products will be selected from this formulary. Should a product be required which is not listed, the rationale for this must be supplied in writing on the exception reporting form attached. This will aid in the updating process of the formulary. See appendix 1.
- Antimicrobial dressings should only be used on wounds which are clinically infected or critically colonised (where the level of bacterial load is hindering healing). Antimicrobial dressings should only be used for a two week period then reviewed. Refer to 6.0 for further information.
- When prescribing dressings practitioners should ensure there are sufficient dressings to last up to the next review date and not necessarily to the nearest pack size.

2. The Wound Healing Process

The healing of wounds progresses through several stages, the process is a continuous one although the stages are explained individually. Deep wounds heal firstly through the formation of granulation tissue and then through epithelialisation. Shallow wounds where only the epidermis has been damaged, heal through epithelialisation only. The basic stages involved in the healing process are;



Bennett NT and Schultz GS (1993)

2:1 Haemostatic, Inflammatory Stage (0 - 3 days)

The body responds quickly to any disruption of the skin's surface. Within seconds of the injury, blood vessels constrict to control bleeding at the site. Platelets coalesce within minutes to stop the bleeding and begin clot formation.

Damaged tissue and mast cells secrete histamine and other local hormones and enzymes causing vasodilatation of the surrounding capillaries. These capillaries become more permeable and white blood cells and serum are able to pass into the damaged area. The vasodilation and increased capillary permeability cause the signs of inflammation; **redness, heat, swelling** and **pain**.

An influx of polymorphs and macrophages defend against bacteria, ingest debris and begin the process of repair. A number of local and systemic factors can slow or halt this influx of

white blood cells. For example, high doses of corticosteroids such as prednisolone can stop or slow this inflammatory response and subsequent wound healing.

Dead tissue and bacteria are removed in this stage to make way for new growth. Cells in healthy tissues are held together by proteoglycan – fibronectin cement. Where cells die due to injury, the body acts to dissolve this intercellular cement. Liquefaction of connective tissues in order to eliminate necrotic matter is called auto-debridement. Macrophages migrate into the wound and play a vital role in this stage by engulfing bacteria, any foreign bodies and necrotic tissue. With neutrophils, the macrophages attract fibroblasts and influence the growth of new blood vessels into the wound by chemotactic activity and the release of growth factors

2.2 Proliferation Stage 3-24 days

There is extensive growth of epithelial cells under the scab that bridges the wound. With the developing new blood vessels multiplication of the fibroblasts occurs. Fibroblasts begin to produce collagen, a process that depends on zinc, oxygen and ascorbic acid. This may be deficient in some disease states such as diabetes. Collagen strands are deposited in a haphazard way and form a fibrous network that supports the new capillary loops. The tissue formed is called granulation tissue. It has a moist translucent red appearance. Signs of inflammation disappear now and the fibroblasts contract pulling the wound edges together.

Wound contraction is an important part of wound healing as it means that the body does not have to make as much granulation tissue to fill in the wound cavity. The tensile strength of the wound is increased during this stage of the healing process and this process continues into the next phase, the maturation stage.

2.3 Maturation Stage 24 days – 1 year

During the maturation phase, fibroblasts leave the wound and collagen is remodelled into a more organized matrix. This changes the appearance from red granulation tissue to a pink early epithelialisation. Finally a white relatively avascular tissue develops, and the epidermis is restored to normal thickness. Tensile strength increases for up to one year following the injury. While healed wounds never regain the full strength of uninjured skin, they can regain up to 70% - 80% of its original strength.

2.4 Growth factors and their Influence on wound healing

It is thought that growth factors produced by various cells involved in wound healing act to communicate with each other as to 'what to do next'. Examples of growth factors include:

- Platelet derived growth factor
- Fibroblast growth factor
- Angiogenesis promoting growth factor
- Epidermal growth factor

- Transforming growth factor Alpha and Beta
- Vascular endothelial growth factor

Each of these has different roles and for instance epidermal growth factor promotes epithelial growth.

3. Wound types and categorisation

Wounds are categorised by Harding (1992) into acute and chronic wounds.

- Acute wounds comprise of surgical, traumatic and thermal injuries, where it is expected that the healing process should be uneventful and scarring and long term damage minimised.
- Chronic wounds fail to complete the healing process and have an impact on the health status and lifestyle. Chronic wounds include malignant fungating wounds, pressure ulcers, leg ulcers and diabetic foot ulcers. These wounds are the result of systemic disease processes that often require specialist intervention, investigation and treatment of the underlying cause in conjunction with the care of an open wound.

3.1 Open and closed wounds

Sutures, clips or wound adhesives bring the opposing edges of a wound together and create the moist, warm, clean environment necessary for healing. In this situation, dressings are of secondary importance.

However, on open wounds such as abrasions, burns or pressure ulcers, sutures cannot be used. In such open wounds, the choice of dressing is of critical importance as it can provide the right environment to prevent complications and optimise healing.

4. Assessment

Wounds will heal themselves given the right conditions. It is crucial to combine a thorough assessment of the patient with the wound assessment. Identification, improvement and minimisation of any factors known to impede healing will benefit the patients progress. It may not be possible to alleviate all factors that are detrimental to wound healing, however these should be considered in the management and expected outcomes.

Assessment should include information from different sources. It should bring together general and specific information on the patient, the skin and the wound itself, only in this way can an accurate diagnosis be made, risk factors evaluated and effective treatment commenced (Vowden and Vowden 1998).

Patient assessment can be thought of on four levels (Morison, 1992)

- General patient factors that could delay healing
- Immediate causes of the wound and any underlying pathophysiology
- Local conditions at the wound site
- Potential consequences of the wound for the individual

Assessment should identify the following:

Chronic diseases, which prolong or delay healing		
<ul style="list-style-type: none"> ● Circulatory disorders, e.g. Anaemia, peripheral vascular disease and arteriosclerosis. ● Respiratory disorders e.g. Chronic pulmonary disease, bronchitis and pneumonia ● Malabsorption disorders e.g. Crohn's disease, ulcerative colitis ● Metabolic disorders e.g. Diabetes, renal & hepatic failure. ● Disorders of mobility & sensation e.g. Hemiplegia, paraplegia and neuropathy. ● Immune deficiency disorders e.g. Rheumatoid arthritis, HIV/AIDS, malignancy 		
Local factors which prolong or delay healing		
<ul style="list-style-type: none"> ● Impaired blood supply ● Oxygen deficit ● Temperature fluctuations ● Dehydration ● Wound location 	<ul style="list-style-type: none"> ● Age of wound ● Mechanical stress (pressure, shear and friction) ● Extent of tissue loss ● Local infection 	<ul style="list-style-type: none"> ● Type of tissue involvement ● Foreign bodies ● Necrotic tissue ● Skin maceration
Other factors that affect healing		
<ul style="list-style-type: none"> ● Nutritional state ● Dehydration ● Body build ● Systemic infection 	<ul style="list-style-type: none"> ● Stress ● Immuno-suppressive agents ● Drug therapy ● Lack of sleep/rest 	<ul style="list-style-type: none"> ● Aging ● Inappropriate wound care ● Factitious injury ● Pain
Psychological factors which affect healing		
<ul style="list-style-type: none"> ● Motivation ● Concordance 	<ul style="list-style-type: none"> ● Attitudes of patients & carer ● Knowledge & understanding 	<ul style="list-style-type: none"> ● Body image
Lifestyle factors that may affect healing		
<ul style="list-style-type: none"> ● Lifestyle e.g.. patterns of working ● Care environment 	<ul style="list-style-type: none"> ● Financial status ● Major life stress 	<ul style="list-style-type: none"> ● Cultural or religious belief ● Substance misuse

4.1 Wound assessment

The aim of any wound assessment is, to describe the wound appearance and allow accurate classification of pressure ulcers. Measurement of wounds forms an important part of documentation and can be achieved by using tracing maps, disposable rulers or photography. (Refer to local guidelines for photography.)

Assessment of the wound should include a detailed evaluation of:

- Wound classification
- Wound appearance
- Wound exudate, levels and type
- Any signs of clinical infection
- Condition of wound margin
- Condition of surrounding skin

Although wound exudate should not be assessed alone it must be recognised as an important aspect of the healing process and gives distinct clues as to the condition of the wound. Wound exudate is not just an inert fluid – understanding its components will help to improve patient care. An unexpected change in exudate characteristics may indicate a change in wound status or associated disease process and should prompt re evaluation. All the above information should be recorded on a wound assessment chart.

It is essential that a date be set for reassessment of the wound and that any changes in treatment following reassessment should be recorded.

The information gathered from the assessment should form the initial plan of care which should include:

- 1) Factors such as the general appearance of the skin, wound pain or allergies.
- 2) Factors that will delay healing such as general health, nutritional status, underlying disease, medication or incontinence.
- 3) The cause of the wound so that further problems can be prevented, such as immobility resulting in pressure ulcers or diabetes giving rise to a neuropathic ulcer.
- 4) Functional and psychological factors that will result from the wound or its treatment that may delay healing.
- 5) The requirements needed on discharge for the patient and/or carer.
- 6) All factors that could influence wound healing should be addressed. This may include referral to other members of the multi disciplinary team such as Tissue Viability Nurses, Dieticians, Physiotherapists, Podiatrists, General Practitioners, Vascular Consultant or Dermatologist.

4.2 Skin assessment

When selecting wound management products, assessment of the surrounding skin must be undertaken to determine the potential impact the specific product may have on managing the wound characteristics, in addition consideration of allergies must be given. Caring for the surrounding skin may include use of topical treatments.

Definitions of topical skin applications

Emollients: also known as moisturisers. These are grease-based substances which when applied to the skin either trap water in or allow water to be pulled from the dermis to the epidermis. Emollients can be used as wash products in the form of soap substitutes and bath oils. Once washing is complete, emollients can be applied to the skin in the form of lotions, creams or ointments to seal water into the skin (Penzer and Burr, 2005).

For example; Diprobase, Zerobase, Doublebase, Oilatum emollient.

Lotions: these are the lightest and least greasy emollients. They are less effective as they contain less oil.

For example; Dermol lotion

Creams: these have a higher oil content than lotions, allowing the oil to sink into the skin. They are good for daytime use.

For example; Diprobase, Zerobase, Doublebase

Ointments: these have the highest oil content and are very greasy. They can leave the skin looking shiny and clothes greasy. However if the skin is very dry, ointments should be used and may be best applied at night.

For example; Emulsifying ointment, Diprobase ointment.

NB:

Some cream based products may contain preservatives that patients can become sensitive to. Please refer to latest edition of BNF for more information on individual products.

NB:

Please refer to National Patient Safety Agency (NPSA) website regarding use of flammable products

i.e. Yellow soft paraffin.

5. Factors delaying wound healing

Many factors have been recognised that reduce or delay healing, the following are identified as some of the main causes for delay in wound healing.

- **Poor circulation**

Delayed healing and tissue breakdown is frequently associated with poor circulation. This may be due to local pressure, vascular disease or diabetes.

- **Poor nutrition/malnutrition**

Nutrition has a significant impact on wound healing. Lack of protein will result in insufficient building blocks for cell regeneration. Deficiency of vitamin C which is essential for collagen synthesis, will delay healing.

Zinc deficiency will cause slowing down of epithelialisation and collagen synthesis.

- **Drug therapy**

Anti inflammatory drugs suppress initial inflammatory process. Systemic and topical corticosteroids can suppress both multiplication of fibroblasts and the immune system.

- **Immune response**

Allergy to topical applications, e.g. iodine may delay healing. Irritants and allergens include lanolin (wool alcohols), topical antibiotics, emulsifiers such as cetyl alcohol, rubber, parabens group of preservatives, colophony, fragrance mix or balsam of Peru.

- **Age**

Cell replication is slower (senescence) and the skin's resistance to injury decreases with increasing age.

- **Obesity**

Adipose tissue has poor vascularity. No known mechanism is responsible for increased infection and wound breakdown in obese surgical patients, but these patients are at high risk of postoperative wound problems.

- **Psychological**

Increases in hormone levels, particularly glucocorticoids (occurring in stress and anxiety for example) may suppress the inflammatory phase and affect healing in both acute and chronic wounds. Reducing stress has been demonstrated to reduce postoperative wound infection.

- **Infection**

Local or systemic infection inhibits healing. Resistance to infection is related to physiological ability and the patient's physical health. Bacterial toxins are potent inhibitors of healing. Some have more devastating effects than others.

- **Moisture**

Exposure to excessive exudate can be associated with other clinical issues in chronic wounds. It may result from increased bacterial burden related to local wound infection. Poorly managed urinary and faecal incontinence can have a devastating effect on the skin integrity and represents a significant threat to the peri-anal skin. In severe cases, the skin can also be so badly damaged that a moisture lesion develops. These are painful and require prompt treatment to prevent them growing in size.

- **Temperature**

The optimum temperature for cellular activity and division is 37°C. Frequent dressing changes, application of cold solution and leaving the wound exposed can decrease the local temperature.

- **Chemical**

Inappropriate use of chemicals, for example, dyes or antiseptics, can damage the wound and retard healing. This practice should be discouraged.

- **Mechanical**

Unnecessarily disturbing the wound bed can damage the developing granulation tissue. Inappropriate dressings can also damage the granulation tissue. Mechanical cleansing of the wound is not required.

- **Malignancy**

Malignancy can inhibit healing as can a range of anti-neoplastic therapies

- **Drug Therapy**

Some medication has the potential to cause ulceration e.g. Nicorandil.

- **Sensory Neuropathy**

Sensory loss as a result of diabetic peripheral neuropathy is a major factor contributing to foot ulceration, 15% of diabetic neuropathy sufferers develop foot ulcers (Bild et al(1989) cited in Baker et al (2005). Sensory neuropathy can have other causes and the foot is at risk due to the loss of protective sensations. Damage to the tissues happens and the patient less likely to limit function due to the lack of pain from the wound, they are more likely to underestimate the seriousness of the wound.

NB pain in a foot that normally has no sensation can be a sign of infection and should be noted and investigated.

- **Local factors**

Poor surgical technique such as over use of diathermy or poor choice of suturing material are among factors that will delay healing of a surgical wound (Leaper and Gottruo 1998) Poor assessment or some wound care practices may predispose to delayed or non healing.

Inappropriate choice of wound dressing, the use of fibre shedding materials like cotton wool or gauze swabs, tight bandaging can all lead to deterioration in the wound.

- **General factors**

Poor assessment of the cause of the wound can lead to inappropriate treatment and this will lead to poor healing. Any deterioration in the patients overall health adversely affects healing.

- **Pain**

All wounds have the potential to cause pain, and the nature of the pain varies with the type of wound. Many factors may exacerbate pain, including infection and dressing change. Inadequately managed pain can lead to adverse physical and psychological patient outcomes. Continuous, unrelieved pain activates the pituitary-adrenal axis, which can suppress the immune system and result in post-surgical infection and poor wound healing

Continuous, unrelieved pain also affects the psychological state of the patient and family members. Common psychological responses to pain include anxiety and depression. The inability to escape from pain may create a sense of helplessness and even hopelessness, which may predispose the patient to a more chronic depression (Wells et al 2008)

- **Other**
Smoking

6. Wound colonisation / clinical infection

Increased bacterial load on the wound bed is a common factor that can delay wound healing. An understanding of microbiology concepts, normal wound healing process and the ability to identify factors which are delaying wound healing is crucial for any practitioner involved in wound care.

All chronic wounds that are healing by secondary intention will be contaminated with a variety of bacteria, but this level of bacteria will NOT affect wound healing, therefore DOES NOT require routine use of antimicrobial dressing. Although wounds may become colonised by a diverse range of bacteria, infection is not an inevitable consequence. Only wounds that are critically colonised or infected require topical antimicrobial dressings and the effect of these dressings need to be regularly reviewed to ensure treatment is effective and discontinued as soon as bacterial load is under control. Clinical wound infection occurs when there is a presence of multiplying bacteria which results in a host response. Identification of wound infection should be viewed as a clinical skill which is supported by laboratory finding when necessary, but should not rely on pure laboratory science. Signs and symptoms of clinical wound infection include Erythema, heat, swelling, pain, abscess formation, pyrexia, and raised white cell count (with no other source of infection).

Wound swabbing should only be undertaken when signs of clinical infection are present. Routine wound swabbing should not be undertaken. All wounds contain microorganisms yet the majority are not clinically infected, wound swabs will often show evidence of bacteria (contamination), positive wound swab results need to be taken in context of clinical symptoms and DO NOT routinely need to be treated with either topical antimicrobials or systemic antibiotics. To reiterate reports of growth of organism on a laboratory result is not an indication for antimicrobial/antibiotic therapy.

Topical antimicrobial dressings contain agents to provide sustained antimicrobial effects; these include ones containing Honey, Silver, Iodine and PolyhexamethyleneBiguanide (PHMB). The aim of these dressings is to reduce the bacterial load therefore prompting healing. However it is important to note that there is a lack of robust evidence that antimicrobial dressings are effective in preventing or treating infection and widespread use may result in bacterial resistance and toxicity. The need for an antimicrobial dressing should be based on holistic assessment of the patient and the wound. It is imperative to select a wound management product which is appropriate for the tissue type, the level of exudate and patient comfort. Other options of reducing bacterial load should be considered including wound debridement which may eliminate the need for topical antimicrobials.

If antimicrobial dressings are utilised they require regular review and once consistent signs of healing are observed antimicrobial therapies should be stopped. If there is no evidence of wound improvement after 2 weeks of treatment with an antimicrobial dressing, it is recommended that an alternative topical antiseptic or antimicrobial agent is used. If the

wound begins to show further signs of infection, the use of a systemic antibiotic should be considered, (Wounds UK, 2010).

It should be noted that infection of Diabetic foot Ulceration often requires aggressive treatment including antimicrobial therapy in combination with antibiotic therapy and will require review by a member of the Diabetic foot team (NICE, 2011), as often effective management requires surgical incision, aggressive debridement and drainage with or without re vascularisation, (American Diabetes Association, 2003).

7. Wound cleansing

The aim of cleansing is to create the optimal local conditions for a wound to heal by removing exudate, debris such as dressing residue, slough and necrotic tissue. (Morison 1989)

Wound cleansing should only be considered following a thorough assessment of the wound. If the disturbance to the wound bed is not justified, then the wound is probably best left alone. (Cutting 1990)

The most common solutions, which are currently used, are sodium chloride 0.9% or tap water. The use of antiseptics are no longer recommended, as they are not effective and are potentially harmful (Miler 1994)

Practice Guidelines

- Irrigation is the preferred method of wound cleansing
- Irrigation solutions should be applied at approximately 37°C to prevent a drop in the wound bed temperature
- Chronic wounds such as venous leg ulcers can be cleansed using tap water and an emollient
- Do not use cotton wool balls/gauze as they shed fibres prolonging the inflammatory phase, delaying healing. (Surgical Materials Testing Laboratory 1992)

8. Nutrition and hydration

Good nutrition facilitates the wound healing process but malnutrition will delay, inhibit and complicate wound healing. Many nutrients have a role to play in wound healing, working in isolation or in combination with others.

Whilst a large percentage of patients admitted to hospital are already malnourished, it must also be recognised that many have a good nutritional status which deteriorates once admitted due to the consequence of their illness.

In a malnourished patient the phases of healing are the same. However, wound healing takes a large amount of metabolic energy due to an increased number of inflammatory cells, and the fibroblastic formation of collagen and matrix remodelling. **In the patient with protein energy malnutrition the healing process can take 5 – 10 times longer.**

Nutrition is a crucial aspect of a holistic approach to the healing of wounds. (Todorovic 2002).

Nutritional status should always be assessed in patients with wounds; if patients have a decreased nutritional status then this can be addressed.

NICE Clinical Guideline 32 - Nutritional Support in Adults offers best practice advice on the care of adults who are malnourished or at risk of malnutrition and how to identify them. The malnutrition universal screening tool (MUST) is recommended - www.bapen.org.uk/pdfs/must/must_page1.pdf.

It is therefore important to encourage patients to have a wide and varied food intake to provide a balanced diet to maintain body cell mass and promote wound healing.

Carbohydrates provide the energy for the inflammatory response to occur

Protein deficiency results in impairment of the proliferative and remodelling stage of wound healing. Impaired collagen synthesis, reduced wound strength and increase in infection due to a compromised immune system has been reported. (Collins 2001)

Fats have a key role in the structure and function of cell membranes and are directly involved in cholesterol metabolism, the formation of inflammatory mediators, and clotting components. Following injury there is an increased requirement for polyunsaturated fatty acids, during the inflammatory phase of healing. Recent studies suggest that omega-3 fish oils are beneficial as they have an anti-inflammatory response and could influence wound healing. (McClaren 1992)

Vitamins: Many vitamins are involved in wound healing, the main one being vitamin C. This is vital for collagen synthesis, as it is an essential co-factor in the hydroxylation of proline.

Deficiency of vitamin A and Vitamin B complex will also have adverse effects on wound healing.

Zinc, Copper and Iron are the main minerals in wound healing. Zinc deficiency inhibits wound repair by reducing the rate of epithelialisation and cellular proliferation. It is also an essential co-factor in many enzyme systems, as is copper, which plays an important role in collagen and elastin synthesis. Iron deficiency needs to be avoided, as an inadequate blood flow to the wound site will inhibit the healing process.

Other supplements of vitamins and minerals, however, should be avoided as this can be detrimental to the patient, affecting absorption and metabolic interactions and, ultimately, impair nutritional status.

Hydration. In addition to nutrition, fluid balance is important. Dehydration can result in diminished healing ability since water is a major component of healthy cells. A large wound may exude significant volumes of fluid that can result in electrolyte imbalance as well as dehydration. A heavily exudating wound may also delay healing by macerating surrounding skin.

9. Pain assessment

Unresolved pain negatively affects wound healing and has an impact on quality of life. Pain at wound dressing-related procedures can be managed by a combination of accurate assessment, suitable dressing choices, skilled wound management and individualised analgesic regimens. For therapeutic as well as humanitarian reasons it is vital that clinicians know how to assess, evaluate and manage pain.

Having a basic understanding of pain physiology will help anyone involved in a wound dressing-related procedure to understand the patient's pain experience. It is fundamental to appreciate that pain from wounds is multidimensional, and the patient's psychosocial environment will influence and impact on the physiological experience of pain.

Practical applications

- Assume all wounds are painful
- Over time wounds may become more painful
- Accept that the skin surrounding the wound can become sensitive and painful
- Accept that for some patients the lightest touch or simply air moving across the wound can be intensely painful
- Know when to refer for specialist assessment

Ref - Principles of best practice: Minimising pain at wound dressing-related procedures. A consensus document. London: MEP Ltd. 2004

10. Choosing the ideal dressing

There are two different categories of dressings:

- 1) Primary – This is in contact with the wound.
- 2) Secondary – This is not in contact with the wound but it covers the primary dressing.
When choosing a secondary dressing ensure its compatibility with the primary wound contact layer.

There are many hundreds of wound products available, all having slightly different properties. The ideal wound management choice is dependant on the type, depth and colour of the wound in conjunction with the stage of healing and what the main objective of treatment is: e.g. debridement or protection. Dressing choice should also be influenced by the level and type of exudate.

The ideal dressing is considered to be, one that ensures optimal healing and addresses the following:

- **Maintain high humidity**

Epidermal cells require a moist (not wet) surface to permit them to migrate across the wound surface. A dry wound forces the cells to burrow deeper until they meet a moist level, delaying healing. This is based on the initial work of George Winter (1962). Studies have shown that the moist environment enhances natural autolytic processes by breaking down necrotic tissue.

- **Removes excess wound exudate**

Exudate, micro organisms, toxins and dead cells are removed to relieve maceration, tissue oedema and to reduce pain and swelling. The dressing choice will allow control of the exudate, either by absorbing it into the dressing or by passing it onto a hydrophylic absorbent secondary dressing (Cherry and Harding 1997).

- **Permit thermal insulation**

A constant temperature of 37° C is essential to maintain biological processes (mitosis and enzymatic activity).

- **Impermeability**

A dressing should prevent bacteria gaining access to the wound surface. A soaked or leaking dressing provides a pathway for bacteria in either direction. Some dressings are waterproof allowing showering whilst in position.

- **Gaseous exchange**

At different phases of wound healing both hypoxia and normal amounts of oxygen are required. A more rapid restoration of the microcirculation occurs in an anaerobic environment. High levels of oxygen are necessary for the development of fibroblasts and collagen.

- **Non fibre shedding / non toxic**

Fibres shed into the wound can cause irritation and can become a focal point for infection. Granulating tissue can grow into the open mesh, attaching the dressing to the wound. Local irritation or sensitivity can occur with some products.

- **Non adhesive, comfortable and conforming**

The dressing must be non adhesive to the wound bed and protect the wound and surrounding skin from further trauma. (Dealey 2004). Patient concordance is best achieved with a comfortable, conforming, flexible dressing causing minimal pain when changed and does not take excessive time to redress.

- **Care of ischaemic wounds**

The toes and sometimes the foot can be affected by so called “dry gangrene” in chronic arterial insufficiency. The tissues are black, shrivelled and dry. Whilst it is traditionally called gangrene there is in fact no infective process. The tissues are undergoing spontaneous breakdown and drying. It is a form of mummification. It is important that such areas, unlike other wounds, are kept dry. Introducing moisture carries the risk of infection. Ideally the area should be left exposed to the air. A non adherent dressing to separate toes is useful. If a dressing is required it should be light, dry and allowing the circulation of air.

11. Guidelines for good practice in the management of wounds

- Always employ an holistic approach to wound care: e.g. investigate any underlying problems
- Wounds should not be routinely cleansed, but if they require cleansing irrigation should be used
- Good hand hygiene must be practiced at all times
- Nutrition assessment must be completed and acted upon
- It is essential that a date be set for reassessment of the wound and that any changes in treatment following reassessment should be recorded
- Wounds should not be left exposed or wrapped in a dressing towel. The action of dehydration and reduction in wound temperature is detrimental to wound healing
- A multidisciplinary approach must be taken in wound care
- A clear explanation of the action of certain types of dressings must be explained to the patient
- Avoid layering dressings, most products are designed as a primary dressing, use of more products only reduces the effectiveness of the product.
- All dressings should be disposed of according to local waste disposal guideline
- All dressings must be prescribed
- **For any wound not progressing as anticipated consider referral to the Tissue Viability Team by using the appropriate referral process.**

12. Dressing Selection

Wound Type	Necrotic	Infected	Sloughy	Granulating	Epithelialising	Fungating/ Malodorous	Cavity
Characterised by	<ul style="list-style-type: none"> • Presence of dead or devitalised tissue. • Black/brown colouration • Wound will not heal until necrotic tissue is removed 	<ul style="list-style-type: none"> • Inflammation, localised heat or swelling, yellow pus, offensive odour. • Green/Yellow discolouration 	<ul style="list-style-type: none"> • Slough - soft necrotic tissue and dead phagocytes • Yellow colouration • Wound will not heal until slough is removed 	<ul style="list-style-type: none"> • Shiny granulation tissue - connective tissue and capillary loops. • Bright red colouration 	<ul style="list-style-type: none"> • Epithelial cells multiply and migrate towards area of cell deficit • Pink colouration • Epithelial cells only migrate over live granulating tissue 	<ul style="list-style-type: none"> • Offensive smell 	<ul style="list-style-type: none"> • Size/depth • Potential for tracking • Wound exudate (devitalised tissue)
Aims	<ul style="list-style-type: none"> • Debride by rehydrating and loosening eschar by autolysis (caution in patients with diabetes, and those with ischaemic wounds) 	<ul style="list-style-type: none"> • Identify infection • Reduce bacterial load and debride slough. • Remove/control odour 	<ul style="list-style-type: none"> • Remove slough and absorb exudate 	<ul style="list-style-type: none"> • Maintain a warm, moist environment • Protect granulating tissue. 	<ul style="list-style-type: none"> • Protect moist, granulating tissue to allow migrating epithelial cells to cover wound. • Debris, blood clot or eschar cells to grow deep in the wound. 	<ul style="list-style-type: none"> • Reduction of offensive odour • Exudate management 	<ul style="list-style-type: none"> • Promote debridement • Manage exudate levels
Suggested Products - not listed in order of preference	<ul style="list-style-type: none"> • Actiform Cool • Aquacel - Moist • Aquafarm • DuoDERM • Granuflex • Tegaderm • Hydrocolloid • Vacutex 	Antimicrobial dressings <ul style="list-style-type: none"> • Honey • Iodine based • Kendall AMD • LarVE • Metronidazole gel • Silver dressings 	<ul style="list-style-type: none"> • Actiform Cool • Allelynn • Aquafarm • Granuflex • Honey • LarVE • Sorbsan/Aquacel • Tegaderm • Hydrocolloid • Vacutex 	<ul style="list-style-type: none"> • Actiform Cool • Allelynn • Atrauman • Cavilon • Mepilex • Mepore/Mepitel • N-A Ultra • Tegaderm 	<ul style="list-style-type: none"> • Actisorb Silver 220 • Allelynn • Aquacel • Carboflex • Mepilex • Mepitel • Metronidazole gel • Sorbsan 	<ul style="list-style-type: none"> • Allelynn cavity • Aquacel Ribbon • Sorbsan Ribbon • VAC therapy 	
For enquiries regarding wound management contact:-	Skin protectant - designed to provide a barrier between skin and body fluids - use Cavilon Refer to specialist units where appropriate						
Tissue Viability Team	CHALLENGING WOUNDS E.g. burns and plastics OVER GRANULATING WOUNDS Overgranulation is where the granulating tissue has exceeded the level of the wound surface, therefore hindering epithelialisation. Consider adhesive foam dressing as first choice DIABETIC PATIENTS Caution with occlusive dressings in patients with diabetes. Hydrogels and Alginates are available for patients with diabetes.						

Produced by South West Yorkshire Wound Management Group for use in Calderdale, Kirklees, Wakefield and Pontefract District NHS organisations

13. Information and practice guidelines for the products included in the formulary

13.1 Alginates (e.g. Sorbsan) and hydrofibre (e.g. Aquacel)

Alginates are dressings derived from alginic acid extracted from seaweed. The gelling characteristics of alginate dressings vary according to the product used. Some products only gel to a limited extent to form a partially gelled sheet that can be lifted off, others form an amorphous gel that can be rinsed off with water. A secondary dressing is needed. They are highly absorbent and are suitable for moderately or heavily exuding wounds, but not for eschars or for dry wounds.

Aquacel dressings are hydrofibre dressings which combine:

- The healing benefits of hydrocolloids
- A fluid handling capacity exceeding that of the alginates
- Reduce microbial transmission by retaining bacteria and minimising airborne dispersal during dressing changes
- A pain free removal
- Aquacel can be applied moist to a dry wound with eschar

Guidelines for use

- Useful for debriding
- Aquacel can be moist when applied to a dry wound
- Highly absorbent, suitable for use on medium to high exudate
- Cover with a secondary dressing
- Can be used on clinically infected wounds but the patient will require systemic antibiotics and daily dressing changes
- May be left in place for a maximum of seven days
- If filling cavities do not pack the dressing tightly
- Alginates are considered to have some haemostatic properties

13.2 Foam dressings (e.g. Allevyn)

Most foam dressings are made out of polyurethane foam or silicone foam. They are low adherent and are suitable for light to moderately exuding wounds. Used as a primary dressing on clean granulating wounds or as a secondary dressing on sloughy wet wounds.

Guidelines for use

- Available with or without adhesive borders
- They can be cut/ shaped to aid application (except Allevyn Cavity). This should be considered before selecting a 'shaped dressing' as it may be more cost-effective e.g. a square Allevyn adhesive can be cut/ shaped to aid application to a heel wound.
- A variety of shapes are available. Consider the full range of shapes and sizes prior to selection e.g. Allevyn heel can be applied to elbow wounds

- Allow at least 2cm overlap around the wound edges
- Can be left in place up to 7 days depending upon exudate levels.
- Do not secure with an occlusive dressing as this may lead to tissue maceration
- Can be used on clinically infected wounds; however the patient may require systemic antibiotics and daily dressing changes (Morgan, 2000).
- May be useful on overgranulation tissue
- Not recommended for dry wounds
- Can be used under compression bandages/ hosiery
- Foam dressings should be used as a wound care product and not a pressure relieving product. Other devices are more suitable for this purpose e.g. Dermal pads.
- Allevyn cavity is a conformable, absorbent, non-adhesive dressing comprised of perforated, low-adherent outer layer with a core of foam chips – suitable for cavity wounds.

13.3 Silicone dressings (eg Mepitel, Mepilex and Mepilex Border)

13.3a Mepitel

Mepitel is a porous, transparent and flexible wound contact layer with adherent properties. It consists of a flexible polyamide net coated with a soft silicone layer. Mepitel is not absorbent, but contains apertures or pores approximately 1mm in diameter that allows the passage of exudate into a secondary dressing. The secondary dressing must be changed as required by the conditions of the wound and the amount of exudate in order to prevent maceration.

Indications

- Typical use is in the management of wounds where adherence of a dressing to the underlying tissue presents a particular clinical problem.
- Typical applications include skin tears or abrasions, surgical excisions, second-degree burns, blistering conditions such as Epidermolysis bullosa, lacerations, partial and full thickness grafts, and skin damage following radiotherapy or steroid therapy.

Guidelines for use.

- If clinically indicated the wound should be cleansed and the surrounding skin thoroughly dried
- Choose a size of Mepitel that covers the wound and the surrounding skin by 2cm. It can be cut to size if needed before removing the protective outer films. If more than one piece is required, the dressings may be partially overlapped, ensuring that the pores are not blocked.
- Moistening gloves with sterile water or saline will help to stop the dressing from sticking to the fingers and thus facilitate application.
- Smooth the dressing in place ensuring a good seal with the surrounding skin.
- Where clinically indicated, topical steroids or antimicrobial agents can be applied either over or under the Mepitel
- Apply a secondary absorbent dressing pad and a suitable fixation device or bandage.

Frequency of change.

- Mepitel can be left in place for extended periods, up to 7-14 days in some instances. The outer absorbent layer should be changed as frequently as required.
- Warning; If Mepitel is used on burns treated with meshed grafts or after facial resurfacing imprints can occur if excess pressure is placed upon the dressing. As with all types of dressings, wounds should be regularly monitored for signs of infection or deterioration.

Contra-indications

- The manufacturers have identified no absolute contra-indications to the use of Mepitel.

13.3b Mepilex and Mepilex Border

Mepilex and Mepilex Border are absorbent, atraumatic dressings made from polyurethane foam. The outer surface has a vapour-permeable membrane which acts as a barrier to liquid and microorganisms. The wound contact surface is coated with a soft layer of silicone that does not stick to the surface of the wound or cause trauma to delicate new tissue on removal.

Indications

- Mepilex and Mepilex Border are suitable for many types of exuding wounds including leg and pressure ulcers, and traumatic wounds resulting in skin loss. The dressing absorbs exudate and maintains a moist wound-healing environment whilst minimising the risk of maceration.

Guidelines for use

- Available with or without adhesive border
- Allow at least 2cm overlap around the wound edges
- The non-bordered dressing may be held in place with a bandage or other suitable retention aid
- If clinically indicated, the wound should be cleaned and the surrounding skin thoroughly dried before application of the dressing.

Frequency of change

- The interval between changes is determined by the degree of exudate produced. The dressing may be left undisturbed for several days on clean lightly exuding wounds or clean non-infected wounds.

Contra-indications

- Highly exuding wounds

13.4 Hydrocolloids (e.g. Granuflex and DuoDERM)

Hydrocolloids act by autolysis, rehydrating the wound thereby promoting debridement. The dressing can be used throughout the entire wound healing process and can provide local pain relief by keeping the nerve endings moist. (Morgan 2000)

Some hydrocolloids, including Granuflex and DuoDERM, contain gelatin of porcine origin (of purified pharmaceutical quality), however, the manufacturers have a document written by a Muslim cleric advising on their use in members of the Muslim faith. The Comfeel range of dressings do not contain gelatin, the only hydrocolloid in these products is sodium carboxymethylcellulose.

Guidelines for use

- Hydrocolloids absorb low to medium levels of exudate
- Hydrocolloids form a yellow gel as the exudate is absorbed; this may be malodorous and should not be confused with clinical wound infection
- The dressing is waterproof enabling the patient to shower
- Care should be taken when applying to fragile skin
- Use with caution on diabetic foot ulcers, which require regular evaluation
- The dressing is more flexible and gives better adhesion if warmed in the hands prior to use
- Apply with a minimum of 2 cm beyond the wound edges to aid good adhesion
- Secondary dressings are not required
- Leave dressing on the wound for 3 – 7 days
- Lightly dust with un-perfumed talcum powder to reduce rucking of the edges of the dressing
- In some cases overgranulation may occur, this may resolve spontaneously when the dressing is no longer used

Contra indications

- Highly exuding wounds – consider alginates
- Not suitable for clinically infected wounds
- In the presence of an anaerobic infection, occlusive dressings should not be used

13.5 Hydrogels (e.g. Aquaform or Actiform Cool)

Hydrogel dressings are available as an amorphous gel or in the form of a sheet. A secondary dressing is usually required. These dressings are usually used to donate liquid to dry sloughy/ necrotic wounds and facilitate autolytic debridement. They may also have the ability to absorb limited amounts of exudate.

Guidelines for use

- Can be used throughout the entire wound healing process
- Remove by irrigation if necessary
- Can be used on clinically infected wounds but will require systemic antibiotics and daily dressing changes (Morgan, 2000)
- Change between 1 – 3 days
- For amorphous gels (e.g. Aquaform) apply a minimum of 5mm and cover with a secondary dressing

- Amorphous hydrogels can be introduced into narrow wounds and sinuses if necessary
- Dry or necrotic wounds may require an occlusive secondary dressing e.g. film
- Effectiveness may be compromised if used under compression bandages
- Hydrogels have been found to be useful in the management of moisture excoriation due to incontinence when applied as a lotion after cleansing
- Actiform cool is suitable for painful wounds and skin conditions. It can be used under compression. It should be changed if it becomes discoloured or opaque.

Contraindications

- Unmanageable exudate – consider an alginate or hydrofibre
- Maceration of the surrounding skin – consider skin protection and review primary dressing

13.6 Non/low Adherent Dressings and wound contact materials

These dressings can be made from a variety of materials but the majority of them are made up of silicone and polyimide net. These dressings vary in their non adherent properties.

Silicone coated dressings are usually non-adherent, while others are mostly low adherent.

Guidelines for use

- Often used as a primary dressing on granulating/lightly exuding wounds
- Low adherent dressings can cause trauma if care is not taken when removing
- These dressings have limited absorbency and strike-through may occur
- Frequency of dressing changes varies and is required before or when strike-through occurs
- Mepitel is considered to be cost effective only if left in-situ for a minimum of 7 days but will require a secondary dressing change as required
- Apply in single sheets – do not layer

13.7 Film dressings (e.g. Tegaderm)

Provide a moist wound healing environment. They are non absorbent but are vapour permeable. Most are transparent, allowing monitoring of the skin/wound.

Guidelines for use

- Suitable for non exudating wounds, as fluid may accumulate underneath causing maceration
- Can be used prophylactically to reduce risk of trauma from shearing and friction
- Often used for retention of canula/drains or protection around catheters and peg sites
- Use with caution on fragile skin
- May be used as a secondary dressing over alginates or gels
- To remove – stretch the film at the corners to release the adhesive and reduce trauma

Contra indications

- Not recommended for routine use on infected wounds

13.8 Skin Protectors (Cavilon)

Designed to provide a barrier between the skin and body fluids.

- Those products that do not contain alcohol are marked as non sting and are recommended
- It can be useful to protect wound edges from maceration secondary to wound exudate
- May be used as a barrier against irritation from body fluids

Guidelines for use

- Single patient use only
- Will not alter the effectiveness of incontinence products
- Cavilon barrier film is available in 1ml or 3ml applicator or a pump spray action bottle
- Can be used around a stoma site to protect against skin excoriation and as a protector against radiation tissue damage for oncology patients, or to protect fragile skin from adhesive stripping
- When using Cavilon cream as a barrier cream re- application is recommended after three incontinent episodes
- Cavilon barrier film is waterproof: reapplication is recommended every 24 – 72 hours under normal use
- Does not contain alcohol and can be used on broken skin with no detriment
- Skin should be clean and dry before application
- Apply a uniform coating over the whole area
- Wash and clean area before reapplication
- When applied to an area where there are skin folds, hold these apart for approximately 30 seconds o allow the skin to dry

13.9 Anti-microbials

Medicated dressings most frequently contain silver or iodine, which are released in an appropriate concentration over time. They assist in infection control by reducing the number of wound pathogens and are effective in the management of both aerobic and anaerobic bacteria. Systemic antibiotics are the preferred choice of treatment for clinical infection but should only be used when absolutely necessary and in accordance with local guidelines. If ischaemia is present and the blood supply to the wound is compromised anti-microbials are particularly useful.

The antimicrobial activity of silver has been known of for many years and its efficacy in preventing secondary infections. The growing threat of antibiotic resistance, and the concerns about safety and toxicity of topical antiseptics, appears to have spurred a surge of interest in silver in wound care products. Investigations into the molecular mechanisms of disinfection support that metal ions such as silver, may inhibit bacterial survival by reacting with the inside or outside of bacterial cells either directly or indirectly.

The use of antimicrobial products within the Wound Care Formulary is recommended with care, and is restricted. All products must only be used following full assessment of the wound to ensure the product is appropriate.

Guidelines for using antiseptic products (e.g. iodine based)

- Should only be used on wounds that are high risk for bacterial contamination
- Effective against a broad spectrum of bacteria, including MRSA, protozoal and fungal infections
- Iodine is absorbed systemically and when using Iodoflex the amount applied must not exceed more than 50g in a single dose or 150g in one week. A course of treatment should not exceed 3 months in duration
- A maximum of four layers of povidone iodine (Inadine) dressings to be applied at one time
- Free iodine content is low but some iodine sensitivity has been reported
- Iodine products are useful in the management of the patient with diabetic foot ulcers when there is an increased risk of clinical infection and potential risk to the limb's integrity
- Remove with care, change dressing when the colour changes to white
- Dressing requires changing frequently if levels of antibacterial activity are to be maintained
- Requires a secondary dressing

Contra Indications for using iodine based products

- Should not be used on patients with a known iodine sensitivity, thyroid disease, pregnant and breast feeding women, or patients on lithium (Morgan 2000)
- Not recommended for children under 2 years.
- Should be avoided in patients with severe renal impairment

Guidelines for using silver dressing products (e.g. Aquacel AG)

- Effective against bacteria, including MRSA, protozoal and fungal infections
- Most are applied directly to the wound bed, should adherence be a problem apply a non-adherent dressing first
- Some require a secondary dressing
- Change between 1-7 days refer to product guidelines
- Silver sulfadiazine (Flamazine) is available for limited use in certain circumstances
- All silver dressings should be used with caution as the mechanism of action differs between products
- It is essential that a date be set for reassessment of the wound and that any changes in treatment following reassessment should be recorded

Special precautions

- Use with caution in pregnant or lactating women
- Use with caution in patients with hepatic and renal impairment

14. Specialised dressings

14.1 Honey (e.g. Activon)

Antibacterial properties of honey and its potential in the treatment of wounds has been extensively reviewed by Molan (1992 and 1999.) The mechanisms by which honey influences the wound healing process are currently incompletely understood. (Tonks et al 2001)

Molan (2005) recommend honey to treat all aspects of wound healing, stating that honey has:

- Anti-inflammatory properties
- Clearance of infection
- Deodorising action
- Barrier function
- Provision of the optimum moist healing environment
- Debriding action

For the properties of honey to be most effective within healing, honey needs to be in contact with the wound bed continuously, when the honey has absorbed into the wound bed the dressing needs to be re-applied.

It is essential that a date be set for reassessment of the wound and that any changes in treatment following reassessment should be recorded.

14.2 LarvE therapy

LarvE are sterile maggots of the green bottle fly *Lucillia sericata* and have been found to have a use in cleansing and deodorising wounds that are infected or have devitalised tissue. The Larvae produce powerful proteolytic enzymes that breakdown sloughy or necrotic wound tissue, which is ingested as a source of nutrient.

Guidelines for use

- Supplied in sterile containers (LarvE) or sterile nets (Biofoam)
- Suitable for a variety of wounds, pressure ulcers, leg ulcers, and diabetic foot ulcers
- Can be used to prepare a wound for grafting
- Ensure the correct number of pots, or correct size of Biofoam is ordered by using the LarvE calculator
- Although the maggots remain on the wound for a maximum of 5 days a daily secondary dressing is required this should be changed daily and maggots checked for viability.
- A hydrocolloid should be prescribed, as this will protect the surrounding skin. If using Biofoam then a cream e.g. Sudocrem is used to protect the skin
- Maggots are removed from the wound by irrigation, removing any remaining maggots with forceps or simply remove the Biofoam.

- Any hydrogel used prior to larvae therapy must be completely removed from the wound as it kills the maggots by suffocation
- Should only be used by practitioners who have received training in the use of maggots
- Refer to local policy for more details re use of maggots

Contra indications

- Caution should be used if wounds have a tendency to bleed
- Caution should be used for patients currently on anticoagulants, e.g. warfarin
- Caution should be used if wounds have a sinus or fistula
- LarvE should never be used on wounds that lie in close proximity to large blood vessels
- Increased levels of pain have been reported when used on ischaemic feet

14.3 Protease modulating matrix (e.g. Promogran)

Promogran matrix is made from a freeze dried mixture of 45% ORC (oxidised regenerated cellulose) and 55% bovine collagen. Promogran is able to re-balance and modulate the pathological wound environment in all chronic wounds. Excess proteases are inactivated, whilst endogenous growth factors are protected simultaneously. On absorption of Promogran into the wound the proteases remain inactivated and growth factors are released active back into the wound. Thus Promogran creates a favourable healing environment.

Guidelines for use

- Lightly apply to wound bed, to fit shape of wound
- Promogran absorbs into the wound
- The wound should be clinically free from infection
- Irrigate to cleanse wound if needed
- The wound may appear sloughy if Promogran has not fully absorbed into the wound bed.
- Change daily or alternate days
- Will need a secondary dressing
- May increase wound exudate

NB: Contains collagen of bovine origin.

14.4 Capillary dressing (e.g. Vacutex)

VACUTEX is a 3 mm layered 'sandwich' dressing. The layers of the dressing 'pull' interstitial fluid from the wound and place it within the central layer until saturation when it moves to the third outer layer. VACUTEX can be used on infected or heavily exudating wounds such as venous ulcers, pressure ulcers, burns, fungating wounds, stoma sites, cavity wounds and non-healing wounds. It is available in a range of sizes and can be tailored to suit each wound requirement individually.

Guidelines for use

- Can be used on wet or dry wounds
- Can be layered to absorb exudate

- When used on dry wounds needs occluding with a film dressing
- Must be cut to size

Contra indications

- Do not use on bleeding wounds
- Caution should be used for patients currently on anticoagulants, e.g. warfarin

14.5 Topical Negative Pressure (e.g. Vacuum assisted closure. VAC)

This device assists in wound closure by applying localised, topical negative pressure to draw the edges of the wound to the centre.

Topical negative pressure is applied to a foam or gauze dressing positioned in the wound cavity or over the flap or graft. The foam/gauze dressing helps remove fluid from the wound and stimulate the growth of healthy granulation tissue.

Topical negative pressure devices are only to be used following advice from surgeons or Tissue Viability Nurses.

NB: Refer to local policy/manufacturers guidelines for more details regarding the use of Topical Negative Pressure

14.6 Deodorising dressings (e.g. Carboflex)

Most deodorising dressings are made up of activated charcoal. There are reasons that wounds become malodorous and a thorough wound assessment should be undertaken to determine the cause of the odour.

Guidelines for use

- Can be used in conjunction with other dressings
- Can be combined with metronidazole gel for wounds colonised with anaerobic bacteria, however this should be for a short period only
- Can be used on malignant fungating wounds
- Can be used on infected wounds; however the patient requires systemic antibiotic therapy and daily dressing change. (Morgan 2000)
- Deodorising dressings should be used as a primary dressing. However they may stick to the wound bed, therefore the use of a non-adherent dressing is advised.

15. Challenging wounds

15.1 Over-granulating wounds

Overgranulation is excessive granulation tissue, which stands proud of the rest of the skin. It poses a problem as it prevents epithelial cells from migrating across the wound surface. Suggested treatment in order of preference:

1. **Foam dressings** have been found to reduce the level of overgranulation but need to maintain contact with the wound surface. If not self adhesive they should be secured around the edges to prevent movement and to maintain contact without limiting the dressings evaporation qualities. They should not be occluded with a secondary dressing or tape.
2. **Mild Topical Corticosteroids** (1% hydrocortisone) have been used to reduce overgranulation but the evidence for this is limited. They should be applied daily for a maximum of 7 days and will require a secondary dressing. It should be noted by the practitioner that overgranulation is unlikely to be a licensed indication, even though 1% hydrocortisone is used widely.
3. **Silver nitrate sticks** – are not recommended as best practice and should only be considered when all other options have failed to reduce the overgranulation. They have a caustic effect and destroy overgranulation tissue efficiently but they also damage healthy tissue. Care must be taken with application. Therefore apply yellow soft paraffin type product around the wound edges to protect. Use should only be after full consultation with medical practitioner responsible for that aspect of the patient's care.

NB: Please refer to National Patient Safety Agency (NPSA) website regarding use of flammable products i.e. Yellow soft paraffin.

15.2 Fungating wounds:

Fungating wounds occur when a cancerous mass invades the epithelium thus ulcerating through to the body surface (Dealey 2000). The common symptoms of a fungating wound are malodour, copious exudate, pain, and bleeding. If surgical intervention is not appropriate or healing is an unlikely outcome, the treatment objective is palliative and the care should focus on symptom control. The objective of the dressing is not to promote a healing environment but to promote comfort and manage the symptoms efficiently. Metronidazole gel has antibiotic properties and is useful in the palliative treatment of malodorous, malignant wounds.

15.3 Burns

Burns are traumatic wounds caused by excessive heat or cold, which damages the tissue to varying degrees. When considering the management of burns, the extent of the injury must be defined as the treatment varies drastically. The treatment of minor burns is dependant on the condition of the wound bed and should be managed as any other wound.

Burns are susceptible to infection and often antimicrobials are used prophylactically. (Dealey 2000)

NB: Staff in Mid Yorkshire Hospitals Trust should refer to burn management pathway and policy for more details regarding management of thermal injuries.

15.4 Ischaemic/vascular wounds

The toes and sometimes the foot can be affected by so called “dry gangrene” in chronic arterial insufficiency. The tissues are black, shrivelled and dry. Whilst it is traditionally called gangrene there is in fact no infective process. The tissues are undergoing spontaneous breakdown and drying. It is a form of mummification. It is important that such areas, unlike other wounds, are kept dry. Introducing moisture carries the risk of infection. Ideally the area should be left exposed to the air. A non adherent dressing to separate toes is useful. If a dressing is required it should be light, dry and allowing the circulation of air.

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17. Glossary of Terms

Angiogenesis:	The generation of new blood vessels in tissues
Autolysis:	The body's natural ability to debride dead tissue. Softening of dead cells brought about by enzymes in the cells themselves.
Collagen:	The main protein constituent of white fibrous tissue
Cellulitis:	A spreading infection into soft tissue.
Colonisation:	Multiplication of organisms without a corresponding host reaction
Contamination:	Presence of micro organism but without multiplication
Contraction:	A function of the healing process in granulating tissue whereby edges of the wound are drawn towards each other
Debridement:	The removal of devitalised tissue and foreign matter
Eczema:	Originates from the Greek word 'to boil over'. Features dry, itching, red and inflamed skin. The words eczema and dermatitis are synonymous. It affects 1 in 10 people in the United Kingdom it can be mild moderate or severe.
Epidermis	The outer layer of the skin, which forms a protective covering of the body. Comprising five layers, the epidermis constantly renews itself, with the bottom or germinative layer producing new cells and the top layer, stratum corneum, made up of dead cells which regularly worn off.
Epithelium	Is the tissue that covers the body surface, lines body cavities and forms glands
Epithelialisation	The final stage of the proliferative stage of tissue healing
Erythema	Redness of the skin due to hyperaemia
Eschar	A scab consisting of dried serum and devitalised dermal cells
Fibroblast	An immune collagen producing cell of connective tissue
Granulation:	The formation of new tissue filling the defect which takes place during, the proliferation phase of healing. The name is derived from the fact that the buds of new tissue take on the appearance of small granules.
Granulations:	Small masses of formative cells containing loops of newly formed blood-vessels which spring up over any raw surface, as the first step in the process of healing of wounds.
Haemostasis:	The termination of bleeding by mechanical or chemical means or by the complex coagulation process of the body, consisting of vasoconstriction, platelet aggregation, thrombin and fibrin synthesis.
Infection:	Micro-organisms are not only present but are multiplying and producing an associated host reaction. This may take various forms.

Maceration:	A softening or sogginess of the tissue owing to retention of excessive moisture. Often showing as white wet tissue.
Necrosis:	The local death of tissue. The tissue is often black /brown in colour and 'leathery 'in texture
Oedema:	The abnormal accumulation of fluid beneath the skin, or in one or more cavities in the body.
Pathogenic:	Disease-producing, and is a term for example, applied to bacteria, capable of causing disease
Slough:	Devitalised tissue which has a yellow/white/grey hue.
Vasoconstriction	Narrowing of the blood vessels which results in the blood flow to a particular part of the body being reduced. Cold will cause vasoconstriction of the vessels under the skin, reducing heat loss and shock due to injury or blood loss