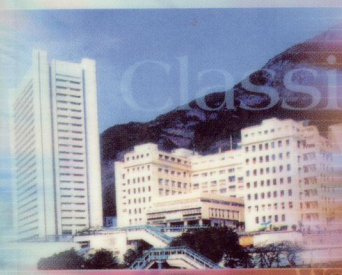

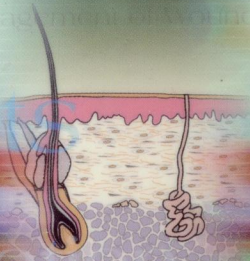

Wound Care Handbook

for nurses

Wound Care Handbook

for Nurses

Department of Surgery

University of Hong Kong Medical Centre

Queen Mary Hospital

Lee Wai Kuen

Nurse Specialist

FOREWORD

Wounds are common problems for the doctors and nurses to look after. Some chronic wounds are particularly distressing for patients and require meticulous, prolonged care to ensure a favourable outcome. At the same time, patients' comfort is also of prime concern. This important job is usually done by our frontline nursing staff, who often cannot find a handy, practical booklet to refer to. For this reason, this handbook was prepared and produced, largely thanks to the efforts of our nurse specialist, Lee Wai-kuen. The aim of this handbook is to provide clinical nurses with a quick yet comprehensive reference for various aspects of wound care. A wide range of different wound care products is also described in detail. The handbook has been designed to be pocket-sized and colour-coded, with a simple layout for easy use. We hope our hardworking nurses will find it useful.

Dr. Lam Lai-kun
Consultant
Plastic & Reconstructive Surgery

Professor John Wong
Head
Department of Surgery

Contents

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Wound Healing Process

1. Inflammatory phase

Duration : from initial injury to day 3

It is characterised by redness, warmth, swelling and pain. It involves haemostasis by temporary vasoconstriction. The mast cells release histamine to cause dilatation of the small arterioles in the dermis in order to increase blood supply to the injured area. Furthermore, the white blood cells migrate to the damaged site to destroy the bacteria.

2. Proliferative phase

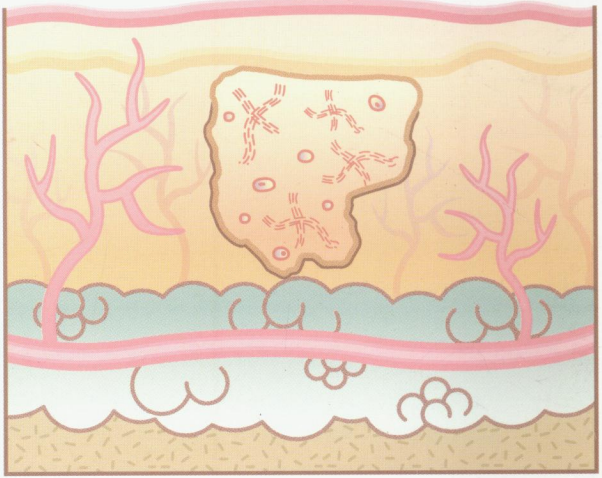
Duration : 3-24 days

During this phase, devitalised tissue and bacteria will be cleared by the white blood cells. Fibroblasts, endothelial cells, collagen fibres and new blood vessels gradually infiltrate the wound. This produces red granulation tissue. In the later stage, wound contraction and epithelialisation will occur.

3. Maturation phase

Duration : 24 days-1 year

The wound fills with granulation tissue and epithelialisation has been completed. The collagen fibres reorganise, remodel and mature. The tensile strength of the wound gradually increases.



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Factors That Affect Wound Healing

I Systemic factors

1. Nutrition

The following nutrients are essential for wound healing:

Nutrient	Function	Deficiency
Proteins	- increase resistance to infection - essential for clotting factors production - collagen synthesis - enhance WBC production - increase fibroblast and epithelial cell proliferation	- oedema - impair cellular immunity
Carbo-hydrates	- supply cellular energy	- body will use the proteins of muscle for energy
Vitamin A	- increases collagen synthesis - increases wound tensile strength - promotes epithelialisation	- delays healing
Vitamin B	- increases collagen linkage - increases wound tensile strength - increases immune response	- decreases collagen synthesis - decreases resistance to infection
Vitamin C	- increases wound tensile strength - decreases capillary fragility	- impairs collagen synthesis - decreases resistance to infection
Zinc	- enhances cell proliferation	- delays healing
Iron	- increases collagen synthesis - increases wound tensile strength	- impairs tensile strength - anaemia, potential risk for tissue ischaemia
Copper	- promotes collagen synthesis	- impairs collagen synthesis

2. Aging

Wound healing in the elderly is slower for biological reasons, and possibly due to the following factors as well: inadequate nutritional intake, dehydration, and impaired circulatory and respiratory functions.

B

3. Underlying diseases

Examples include diabetes mellitus, anaemia, malignancies, and liver and renal failure.

4. Reduced vascularity

Impaired blood supply as a result of pressure, arterial and venous problems delays wound healing since nutrients and oxygen cannot reach the wound for tissue repair.

5. Radiotherapy and immunosuppression therapy

Radiation can damage normal cell growth and reproduction. Immunosuppressive drugs impair white cell activity and increase the risk of wound infection.

II Local factors

1. Infection

Infection can discourage fibroblast activity and destroy existing collagen. Furthermore, the infecting organisms will compete with growing tissues for nutrients and oxygen.

2. Presence of necrotic tissue, slough and foreign bodies

The presence of necrotic tissue, slough and foreign bodies an impede healing and increase the risk of infection.

3. Recurrent trauma

Wounds will not heal in the presence of repeated trauma or impaired blood supply, such as pressure, friction, shearing and careless removal of dressing.

4. Inappropriate wound management

The type of dressing used and its application can affect wound healing. The use of gauze dressing in a granulating wound, for example, will damage new cells during removal.

5. Dry environment

Wounds heal faster in a moist environment due to enhanced epithelial cell migration. A moist environment also facilitates autolytic debridement and reduces pain.

6. Low temperature

Wounds heal more slowly in low temperatures due to vasoconstriction and a decreased metabolic rate. Phagocytic and mitotic activities will also be impaired.

C

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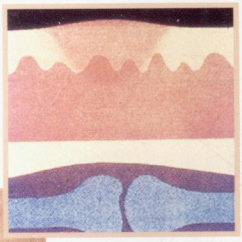
Classification Of Wounds

1. Staging

The staging system was established by the National Pressure Ulcer Advisory Panel, USA, in 1991.

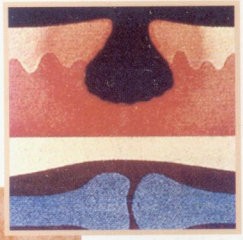
Stage 1

- Non-blanchable erythema of intact skin.
- Appearance: redness, warmth, induration.



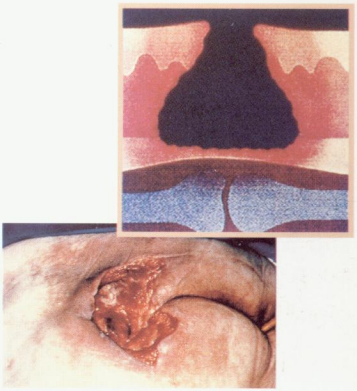
Stage 2

- Partial thickness skin loss involving epidermis or dermis.
- Appearance: abrasion, blister or shallow crater.



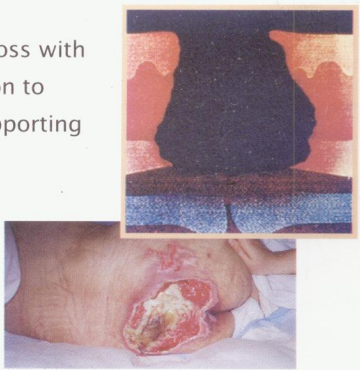
Stage 3

- Full thickness skin loss involving damage or necrosis of subcutaneous tissue which may extend down to underlying fascia.
- Appearance: a deep crater with or without undermining of adjacent tissue.



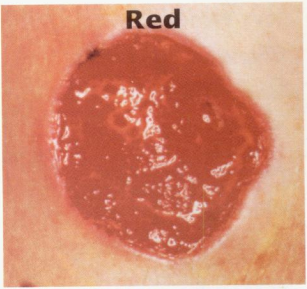
Stage 4

- Full thickness skin loss with extensive destruction to muscle, bone or supporting structures.
- Appearance: a deep crater with involvement of tendon or joint capsule.



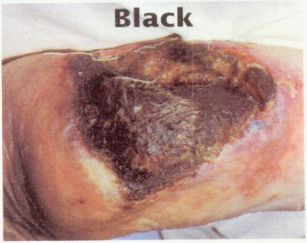
2. Three - Colour Concept (RYB)

Red — Indicates clean and healthy granulating tissue. The wound should be protected and provided with a moist environment for healing.



Yellow — Indicates the presence of slough and dead bacteria. It should be cleansed away before healthy tissue can grow.

Black — Indicates the presence of necrotic tissue and should be debrided away.



The three-colour concept is adopted from Marion Laboratories.

Wound Assessment, Measurement and Documentation

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1. Wound type

a) Acute wound:

such as surgical wound, traumatic wound.

b) Chronic wound:

such as pressure sore, leg ulcer.

2. Location

The site of the wound in relation to anatomical regions, such as the sacral area or shoulder, should be recorded.

3. Exudation

a) Type and colour

i) Serous – clear, straw-coloured fluid

ii) Haemoserous – slightly blood-stained fluid

iii) Sanguineous – bloody fluid

iv) Purulent – pus discharge

b) Amount

This can be documented as minimal, moderate or heavy. The surrounding skin can be macerated by the exudate. Skin protection should be considered for wounds with a moderate or heavy amount of exudate.

4. Wound appearance

a) Granulating

– presence of granulation tissue, red colour

b) Sloughy

– loose, stringy devitalised yellow colour tissue

c) Necrotic

– dead, avascular eschar, brownish or black colour

d) Epithelialised

– presence of epithelial cells, pink colour

e) Infected

– surrounding skin redness, swelling, warmth and pain

D

5. Odour

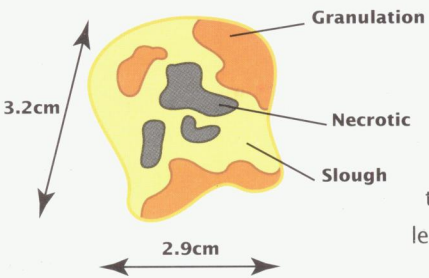
Foul smell indicates wound infection or wound contaminated by faecal matter, such as large bowel fistula wound.

6. Wound measurement

The measurement of wound size should include the length, width, depth and tunnelling.

a) Wound dimensions

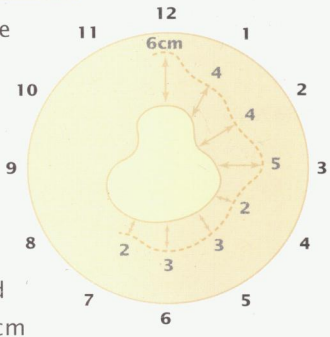
i) 2-dimensional assessment



This is done by tracing the circumference of the wound and using a ruler to measure the length and width.

ii) 3-dimensional assessment

This is done by using a sterile probe or cotton-tipped applicator to measure the depth, tunnel and sinus of the wound in addition to the length and width. The direction of the tunnel or sinus tract is documented as a clock face, e.g. 2 cm tunnel at 4 o'clock.



b) Volume measurement Sterile warm saline or water is instilled into the wound cavity. It is then aspirated with a syringe and the volume measured.

c) Silastic foam mould Sterile liquid silicone is poured into the wound cavity and allowed to solidify quickly resulting in a foam mould of the wound cavity.

d) Photography Serial photography can provide a comprehensive picture of the progress of the wound healing process. However, the accuracy is dependent on the quality of equipment and the experience of the photographer.

e) Computerised wound measurement and documentation This is done by using a digital camera to obtain the image of the wound and the information is input into the computer for measurement and documentation.

7. Surrounding skin condition

The surrounding skin should be assessed for eczema, dermatitis, maceration, or cellulitis. Redness, swelling, heat and pain may indicate underlying infection.

8. Pain

Pain may indicate infection, trauma, vascular problem or retained foreign bodies. Pain must be identified and appropriate treatment should be given.

Sample of Wound Assessment Chart

Name _____ Ward / Bed no. _____

Type of wound _____ Location _____

DATE				
1. SIZE				
2. STAGING				
3. COLOUR*				
4. ODOUR none / some / offensive				
5. DISCHARGE				
colour				
type**				
amount				
6. SURROUNDING SKIN colour***				
Oedema present / no				
7. INFECTION suspect / present / no				
SWAB OBTAINED yes / no				
8. NURSING INTERVENTION				

* Epithelialisation = Pink
Granulation = Red
Slough = Creamy / Yellow / Green
Necrosis = Black / Brown / Grey

** Blood / Pus / Serum / Bowel content / Urine / Saliva

*** Red / Pink / Purple / Yellow / Green / Black

Wound Cleansing Solutions

1. Normal saline (0.9% sodium chloride)

This is the most appropriate cleansing lotion for clean wounds.

Advantages

- will not damage living tissue

Disadvantages

- no disinfectant effect

2. Chlorhexidine

Chlorhexidine is an antiseptic and disinfectant.

Advantages

- effective against a wide range of Gram-negative and Gram-positive bacteria
- low toxicity to living tissue

Disadvantages

- not effective against acid-fast bacilli, fungi or viruses
- antiseptic activity is reduced by blood or organic matter
- no sporicidal activity

3. Cetrimide

Cetrimide is a surfactant and has emulsifying and detergent properties.

Advantages

- good lathering effect and useful for cleansing dirty wounds

- low toxicity to living tissue

Disadvantages

- liable to contamination by *Pseudomonas aeruginosa*
- toxic to fibroblasts

4. Sodium hypochlorite

It has germicidal, deodorising and bleaching properties.

Advantages

- can be used for disinfection of inanimate objects
- used as an antiseptic lotion to cleanse infected wounds

Disadvantages

- toxic to fibroblasts
- delays the production of collagen
- impairs epithelial migration
- prolongs the acute inflammatory response
- causes the release of endotoxins from coliforms
- inactivated by organic matter

E

5. Hydrogen peroxide

Hydrogen peroxide is a weak antiseptic that is converted to oxygen and water in the presence of catalase. The lathering effect achieves mechanical debridement of the wound.

Advantages

- cleanses and deodorises infected wounds

- has germicidal effect against anaerobic bacteria because of the release of oxygen

Disadvantages

- toxic to fibroblasts
- can dissolve clots and cause bleeding
- has risk of oxygen embolisation and surgical emphysema so it is not recommended for deep cavities

6. Povidone iodine

Povidone iodine slowly releases inorganic iodine when it comes in contact with the skin or mucous membrane.

Advantages

- useful against both Gram-negative and Gram-positive organisms, fungi and bacterial spores

Disadvantages

- toxic to fibroblasts
- skin hypersensitivity may occur
- has risk of systemic absorption; prolonged use over large areas can lead to metabolic acidosis, hypernatraemia and renal impairment

Wound Care Products

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The aim of dressing is to prevent infection and promote healing. There is no single dressing that is suitable for all wounds or for all patients. Detailed assessment of the patient and the wound is essential before choosing a dressing.

The ideal dressing:

a protects the wound from infection
b protects the wound from mechanical trauma e.g. shearing force
c provides a moist wound healing environment
d provides thermal insulation
e does not traumatise the wound during removal
f removes debris and excessive exudate
g is free of toxic products
h is easy to apply and remove
i is comfortable
j is cost-effective

1. Hydrocolloids

Product Name	Manufacturer
Biofilm	B Braun
Comfeel Ulcer Care Dressing	Coloplast
Duoderm CGF	ConvaTec
Duoderm Extra Thin	ConvaTec
Hydrocoll	Paul Hartmann
Restore Plus	Hollister
Tegasorb	3M

Action

Hydrocolloids are occlusive, adhesive wafers. They can provide a moist environment for the clean wound to granulate. They also promote autolytic debridement in necrotic wounds.

Indications

- superficial, partial-thickness wounds
- light to moderate exudate wounds
- wounds with slough or necrotic tissue

F

Advantages

- impermeable to bacteria
- support autolytic debridement
- will not traumatise wound during removal of dressing
- self-adhesive, do not require secondary dressing
- provide light to moderate absorption
- may be used under compression

Disadvantages

- not recommended for wounds with heavy exudate
- not recommended for infected wounds or wounds with exposure of bone or tendon
- not transparent, hence not recommended for wounds requiring close observation
- may tear surrounding fragile skin during removal
- may curl up at edges

Method of use

Two cm margin of the dried surrounding skin is needed for good adhesion

Change frequency

- usually 3 to 7 days
- depends on the wound condition and exudate

2. Alginates

Product Name	Manufacturer
Kaltostat	ConvaTec
Seasorb	Coloplast
Sorbalgon	Paul Hartmann
Algisite M	Smith & Nephew

Action

Alginates are derived from seaweed. They are composed of soft, non-woven fibres and are shaped as ropes or sheets. Alginates can absorb exudates up to 20 times their weight. When they are in contact of the wound, they interact with the exudate to form a soft gel. The gel then maintains a moist environment for healing.

Indications

- partial to full thickness wounds
- wounds with moderate to heavy exudate
- cavity or sinus wounds
- infected wounds

Advantages

- can absorb exudate 17 to 20 times their weight
- form a gel over the wound so will not traumatise the

wound during removal of the dressing
- rehydrate dead tissue thereby facilitating autolytic debridement
- have a haemostasis effect
- easy to apply and remove
- can fill in dead space

Disadvantages
- require secondary dressing
- not recommended for lightly exudating wounds or dry eschar

Method of use
- cut to actual size of the wound
- for lightly exudating wounds, soak the dressing with normal saline solution
- film dressing is suggested as the outer dressing in order to retain moisture for lightly exudating wounds
- for heavily exudating wounds, apply directly to the wound
- absorbent pad is recommended as outer dressing for heavily exudating wounds
- for cavity wounds, pack with ribbon-form alginate
- the dressing can be removed by irrigation with normal saline

Change frequency
- usually 12 hours to 4 days
- depends on the wound condition and exudate

3. Foam dressings

Product Name	Manufacturer
Allevyn	Smith & Nephew
Lyofoam	Seton
Tielle	Johnson & Johnson
Sof-foam	Johnson & Johnson

Action

Foams can create a moist environment and provide thermal insulation to the wound.

Indications

- partial to full thickness wounds
- wounds with moderate to heavy exudate
- absorb drainage around tubes

Advantages

- non-adherent, will not affect surrounding fragile skin
- will not traumatise wound during removal
- easy to apply and remove
- absorb light to moderate exudate
- permeable to gases and water vapour
- support autolytic debridement
- can be used under compression

F

Disadvantages

- require tapes or bandages to secure the dressing
- not recommended for dry wounds, wounds with hard black tissue or eschar

Change frequency

- depends on the nature of wound
- may be left in position for 4 to 5 days on clean wounds
- more frequent changes may be required for heavily exudating wounds

4. Film dressings

Product Name	Manufacturer
Bioclusive	Johnson & Johnson
Dermafilm	Vycon
Hydrofilm	Paul Hartmann
Opsite	Smith & Nephew
Tegaderm	3M

Action

Transparent films are adhesive, semipermeable membranes. They allow oxygen and water vapour to cross the barrier but are impermeable to fluid and bacteria. They can maintain a moist environment and promote granulation.

Indications

- superficial wounds
- wounds with light or no exudate
- necrotic or sloughy wounds

Advantages

- impermeable to bacteria
- transparent, enables easy observation of the wound
- will not traumatise wound during removal
- permeable to water vapour and oxygen
- retain moisture, facilitate autolytic debridement
- do not require secondary dressing

Disadvantages

- may tear surrounding fragile skin during removal
- not recommended for moderate to heavily exudating wounds
- may not stay in place for high friction areas
- not recommended for infected wounds

Change frequency

- usually 24 to 72 hours
- depends on wound condition and exudate

5. Hydrogels

Product Name	Manufacturer
Duoderm Gel	ConvaTec
Hydrosorb	Paul Hartmann
IntraSite gel	Smith & Nephew
Nu-gel	Johnson & Johnson
Tegagel	3M

Action

Hydrogels are water or glycerin-based amorphous gel or sheet dressings. They have a high water content and are therefore unable to absorb large amounts of exudate.

Indications

- partial to full thickness wounds
- necrotic or sloughy wounds
- wounds with light to moderate exudate
- burns and tissue damage by radiation

Advantages

- absorb light to moderate amount of exudate
- non-adherent (gel sheet)
- will not traumatise wound during removal
- amorphous gel can fill in cavity wound

- have a soothing effect, thus reduce pain
- rehydrate wound, support autolytic debridement

Disadvantages

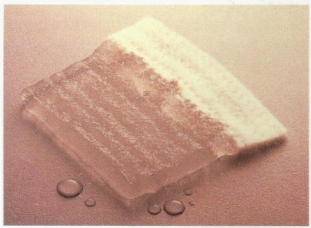
- not recommended for wounds with heavy exudate
- require secondary dressing
- not recommended for infected wounds

Change frequency

- usually 12 to 48 hours
- depends on wound condition and exudate

6. Hydrofibre

Product Name	Manufacturer
Aquacel	ConvaTec



Action

This is a soft, non-woven pad composed of hydrocolloid fibres. It acts by hydrophilic action, absorbing exudate vertically and entrapping it in the fibres. It forms a soft

gel when it interacts with wound exudate, thus providing a moist environment for healing.

Indications

- light to heavily exudating wounds
- dehisced wounds and sinuses
- partial thickness burn wounds

Advantages

- absorbs light to heavy exudate
- will not traumatise wound during removal
- maintains moist environment and supports autolytic debridement

Disadvantages

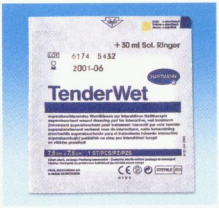
- needs secondary dressing

Change frequency

- should be changed when the dressing is saturated with exudate
- for infected wounds, dressing should be changed at least daily
- for non-infected wounds, it may be left in place for not more than 7 days

7. Polyacrylate pad

Product Name	Manufacturer
TenderWet	Paul Hartmann



Action

This is a multilayer dressing pad with a core of super-absorbent polyacrylate, which is strongly hydrophilic. It is activated with an appropriate volume of Ringer's solution. The constant supply of Ringer's solution to the wound can soften and detach the necrotic tissue.

Indications

- badly healing wounds with heavy exudate
- infected wounds

Advantages

- continuous cleansing of the wound for up to 24 hours
- can maintain the moisture balance
- will not traumatise wound during removal
- can take up wound exudate and trap micro-organisms within the pad

Disadvantages

- needs secondary dressing
- needs Ringer's solution for optimum effect

Change frequency

- every 12 to 24 hours

8. Polysaccharide beads

Product Name	Manufacturer
Debrisan	Pharmacia

Action

One gram of Debrisan beads will absorb four grams of exudate. The bacteria and debris in the wound will be taken up by capillary action and trapped in the spaces between the beads. The debris will be washed away during the change of dressing.

Indications

- heavily exudating wounds
- infected wounds

Advantages

- absorbs heavy exudate
- reduces local tissue oedema
- removes bacteria and debris
- controls odour formation
- useful in cavity wounds

Disadvantages

- sometimes difficult to remove the beads
- not recommended for dry or lightly exudating wounds
- not recommended for use near the eyes or sinus wounds

Change frequency

- usually every 12 to 48 hours
- depends on wound condition and exudate
- normal saline is recommended for irrigating the beads out

9. Iodine-containing products

Product Name	Manufacturer
Braunovidon	B Braun
Inadine	Johnson & Johnson

Action

When these are in contact with wound exudate, iodine will be released slowly, providing a broad spectrum of bactericidal activity.

Indications

- infected wounds
- wounds with slough or necrotic tissue

Advantages

- control odour
- broad spectrum bactericidal activity

Disadvantages

- cannot be used in pregnant or lactating women, young children or patients with thyroid disorders
- not recommended for patients sensitive to iodine

Change frequency

- usually every 12 to 24 hours
- depends on wound condition and exudate

10. Impregnated gauze dressing

Name	Manufacturer
Mesalt	Molnlycke

Action

Mesalt absorbs exudate, debris and bacteria from the wound through hypertonic action.

Indications

- wounds with moderate or heavy exudate
- wounds with purulent or malodorous drainage

Advantages

- easy to remove and apply

Disadvantages

- not recommended for healthy granulating tissue
- not recommended for wounds with dry eschar

Change frequency

- usually every 12 to 24 hours
- depends on wound condition and exudate

11. Collagen-alginate

Name	Manufacturer
Fibracol	Johnson & Johnson

Action

Collagen-alginate consists of 90% collagen and 10% sodium/calcium alginate. When it is in contact with the wound, it absorbs exudate and the collagen component will gradually breakdown. The alginate will form a thin hydrogel layer over the surface of the wound.

Indications

- for moderate to heavily exudating wounds

Advantages

- absorbs exudate
- will not traumatise wound during removal
- easy to apply and remove

Disadvantages

- requires secondary dressing
- not recommended for infected wounds

Change frequency

- usually 1 to 3 days
- depends on wound exudate

12. Tulle gras

Product Name	Manufacturer
Adaptic	Johnson & Johnson
Jelonet	Smith & Nephew
Grassolind	Paul Hartmann

Action

Tulle gras is used as a wound contact layer to reduce the adherence of the dressing (usually gauze pad) to granulating wounds.

Indications

- minor traumatic injuries, ulcers, burns and skin grafts

Advantages

- reduces adhesion
- allows non-traumatic removal

Disadvantages

- does not absorb exudate
- requires secondary dressing
- not recommended to be left in the wound for too long because it will become adherent and cause tissue damage during removal

Change frequency

- usually every 12 to 24 hours
- depends on the wound condition

13. Tulle gras with antibiotics

Product Name	Manufacturer
Sofra-tulle	Roussel

Action

This type of tulle gras is impregnated with lanoparaffin ointment and 1% framycetin sulphate to give it antibacterial activity.

Indication

- for wounds infected with organisms sensitive to framycetin

Advantages

- reduces adhesion
- has anti-bacterial activity

Disadvantages

- may cause allergic reaction

Change frequency

- usually every 12 to 24 hours
- depends on the wound condition

F

14. Non-adherent dressings

Product Name	Manufacturer
Airstrip	Smith & Nephew
Melolin	Smith & Nephew
Primapore	Smith & Nephew
Release	Johnson & Johnson
Tricose	Beiersdorf
Telfa	Kendall

Action

These dressings have a plastic film or other non-sticking materials on their contact surface to prevent them from adhering to the wound. The plastic film can be perforated

to allow the passage of exudate from the wound into the absorbent layer of the dressing.

Indications

- dry sutured wounds
- superficial cuts
- abrasions and lightly exudating lesions

Advantages

- non-adherent
- allow the passage of exudate from the wound into the absorbent layer

Disadvantages

- not recommended for wounds with copious and viscous exudate

Change frequency

- usually every 2 to 3 days
- depends on the nature and exudate of the wound
- for dry sutured wounds, it can be left in place for up to 7 to 10 days

15. Odour-absorbing dressings

Product Name	Manufacturer
Actisorb Plus	Johnson & Johnson
Carbonet	Smith & Nephew
CarboFlex	ConvaTec
Lyofoam C	Seton

Action

These dressings contain activated charcoal to absorb odour and bacteria. Some have also been mixed with absorbent materials to absorb exudate as well.

Indications

- fungating wounds
- infected and necrotic pressure ulcers and leg ulcers
- small faecal fistulas

Advantages

- absorb bacteria and odour
- some can absorb exudate as well
- can be directly applied to the wound bed

Disadvantages

- need secondary dressing
- cannot be cut to fit wound size and shape

Change frequency

- usually at least daily
- depends on the wound exudate

16. Absorbent cover dressing

Name	Manufacturer
CombiDERM	ConvaTec

Action

This is a highly absorbent pad with hydrocolloid adhesive. Exudate is absorbed and locked inside the absorbent portion of the dressing. The absorbent portion swells and softens as wound exudate is being absorbed.

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Indications

- chronic exudating wounds, e.g. pressure ulcers, leg ulcers, diabetic ulcers
- acute exudating wounds, e.g. abrasions, lacerations, surgical wounds

Advantages

- provides moist wound healing environment
- easy to apply and remove
- does not require secondary dressing

Disadvantages

- not recommended for lightly exudating wounds

Change frequency

- can be left in place for up to 7 days
- depends on the amount of wound exudate

Surgical Management of Wounds

1. Acute wounds

a) Simple wounds

Most small traumatic wounds are minimally contaminated. They can be cleansed with mild antiseptics or saline, then closed with stitches, tapes, staples or tissue adhesives (e.g. octylcyanoacrylate). Superficial wounds, like abrasions, usually heal with dressings only.

b) Complicated wounds

These are usually due to trauma, burn or infection.

i) Large area wounds

e.g. extensive burn or toxic epidermal necrolysis. These are associated with large amount of fluid loss, metabolic derangement and are prone to infection. Early systemic treatment includes tetanus prophylaxis, fluid replacement, nutritional support and pain management.

The wounds require dressings to prevent infection, lessen fluid loss and pain. Antiseptic applications, e.g. silver sulphadiazine, help to decrease the chance of infection. Closed method dressings are usually

used. Superficial wounds heal spontaneously. Deep dermal wounds require closure by skin grafting.

ii) Deep wounds

e.g. deglove injuries, compound fractures and necrotising fasciitis. These are usually contaminated, and have foreign bodies, traumatised or non-viable tissue. Early general treatment includes tetanus prophylaxis, antibiotics, pain control and exclusion of other tissue/organ injuries.

The wounds are cleansed and debrided. Primary wound closure is often impossible or inappropriate. They are dressed and delayed primary closure, skin grafting or flap closure is done as indicated.

2. Chronic wounds

These are wounds that do not heal because of their extensiveness or the presence of underlying unfavourable factors. These adverse factors for wound healing, which are detailed in Chapter B. *Management*, include:

a) Correction of adverse factors

Nutritional supplement, correction of anaemia, control of diabetes and improvement of

cardiopulmonary status do help. Avoidance of pressure and improvement of circulation are also important.

b) Appropriate wound care

All chronic wounds are contaminated or infected. Wound care should be directed to suppression of infection and promotion of healing.

There may be underlying local problems such as osteomyelitis, fistulation to the gastrointestinal tract or malignancy. These should not be overlooked and should be treated accordingly.

c) Surgical closure of chronic wounds

Occasionally, chronic wounds are deliberately allowed to heal spontaneously by granulation, when it is considered to be most suitable for the patient. More often, however, some surgical treatments can hasten the healing process and prevent further complications.

3. Surgical options

a) Debridement (surgical toilet)

Removal of foreign bodies, debris and dead tissues in the wound. The wound can be closed or left opened.

b) Wound excision

The skin edge and tissues lining the wound cavity are carefully excised until healthy vascular tissue planes are reached. The wound is closed primarily.

c) Skin grafting (split-thickness)

A piece of partial thickness skin is harvested from the donor site (e.g. the thigh) and transferred to the wound bed, which must be vascular and clean. This is suitable for large wound areas because the donor site heals spontaneously.

d) Skin grafting (full-thickness)

A piece of whole thickness skin is taken and grafted to the recipient area which must be well vascularised and non-infected. It is usually only considered for

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small defects because the donor site has to be closed primarily.

e) Pedicled flap transfer

A bulk of tissue is transferred from the donor site to cover a defect at the recipient site, bringing along with it blood supply through the pedicle. It is suitable for sizable skin and volume defects, as well as defects that are not suitable for skin grafting, e.g. exposed tendon and bone.

f) Free tissue transfer

A bulk of tissue, the free flap, is transferred by complete disconnection of the vascular pedicle (usually one artery and one vein) and joining them back to vessels at the recipient area to re-establish the circulation. Technically it is more difficult than the use of pedicled flaps. However, it allows more choices of donor tissues, even at sites distant from the defect. Different combinations of tissues, e.g. skin, muscle, bone, tendon and nerve can be used as required.

Patient Education

1. Nutrition

a) Emphasise the importance of sufficient and balanced dietary intake.

b) Encourage plentiful protein e.g. meat, eggs and fish, which are particularly important in wound healing.

c) Encourage fresh fruits and vegetables as well to provide vitamins and minerals for healing.

d) The dietitian is helpful in giving individual advice to patients.

2. Exercise and rest

Patients are encouraged to do appropriate exercises in order to promote wound healing.

a) For venous ulcers, the patient is encouraged to take short walks daily to improve circulation and elevate the legs during resting.

b) For pressure sores, the patient is encouraged to change position frequently with the help of others. If the patient is confined to a wheel-chair, he is encouraged to lift his bottom off the seat for a few moments every half hour by pushing up on the armrests of the chair.

3. Skin hygiene

a) Maintain pH of the skin

Avoid the use of harsh chemicals or substances that dry or change the normal pH of the skin.

b) Avoid irritation of the skin

Cleanse and protect skin from excreta and body fluids such as urine, faeces, sweat or wound exudate.

c) Moisturise the skin

Use moisturising lotion or cream regularly to protect the skin. Drink adequate fluids to prevent dehydration.

References

Bryant, R. A. (1992)
Acute and chronic wounds.
Mosby Year Book, Philadelphia.

Carville, K. (1995)
Wound Care Manual.
Silver Chain Foundation, Australia.

Hess, C. T. (1995)
Wound Care.
Springhouse Corporation, Pennsylvania.

Morison, M. J. (1992)
A Colour Guide to the Nursing Management of Wounds.
Wolfe Publishing Limited, London.

Thomas, S. (1994)
Handbook of Wound Dressing.
Macmillan Magazines Ltd., London.

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