

*Dr Sergio Mazzei – Wound Care Surgeon
Al Zahra Hospital Dubai*



Wound Forum

**VOCO Hotel
30th May 2025**

www.drsergiomazzei.health



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SERGIO MAZZEI
WOUND CARE

Topics

- *Dressing*
- *Treatment*
- *Clinical case and discussion*



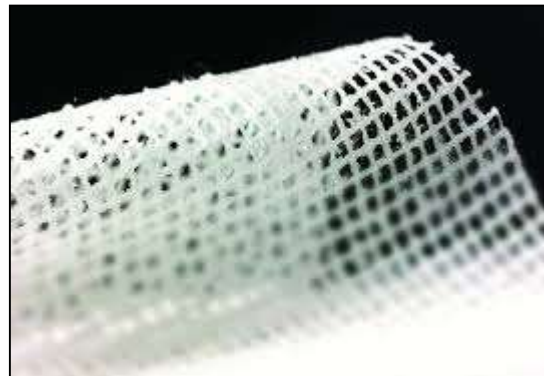
What does wound care mean?

- ✓ A jungle has **no roads, no maps, no signs** — it's wild and unorganized
- ✓ That mirrors situations where everything feels **disordered**, like in a messy office, a crowded market, or a chaotic workplace



Advanced dressing

- ✓ Many classifications
- ✓ Many dressings have been introduced during the past decade
- ✓ It can help to take care of patients with no wound healing



Advanced dressing

History

- Dry wound
- 1962 Winter and Coll.
- Optimal moist microenvironment

Letter | Published: 20 January 1962

Formation of the Scab and the Rate of Epithelization of Superficial Wounds in the Skin of the Young Domestic Pig

[GEORGE D. WINTER](#)

[Nature](#) 193, 293–294 (1962) | [Cite this article](#)

7232 Accesses | 1669 Citations | 57 Altmetric | [Metrics](#)

Advanced dressing

Winter contrasted the healing process of wounds **exposed to air** with those **maintained in moist state**

- He showed that **wounds in a moist environment healed at a significantly faster rate.**
- This study was pivotal in **challenging the longstanding belief** that wounds should remain dry for optimal healing.
- **Emergence of the "moist wound healing" concept.**
- This led to the innovation of **contemporary advanced wound care products.**

Advanced dressing

- Barrier against contamination and trauma
- Reduce contamination
- Removing the necrotic tissue and slough
- Delaying the change dressing
- Quality of life for the patient
- Healing



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Dressing

- Tradition dressing
- Advanced dressing

Traditional dressing - Gauze

- Non-resorbable gauze/sponge dressings made of woven or non-woven cotton-mesh cellulose or cellulose derivatives
- Manufactured in the form of pads or strips
- Protect the wound from external contamination
- Secondary dressing
- Absorb secretions





Advanced dressing

- Hydrocolloid
- Herbal-Based/Ointment-Type Dressings
- Hydrogel
- Enzymatic dressing
- Foam
- Alginate dressing
- Hydroalginate
- Hydrofiber
- Antiseptic dressing
- Wound irrigation





Hydrocolloid

- ✓ It contains hydrocolloidal hydrophilic particles (mainly sodium carboxy methyl cellulose)
- ✓ Gel-forming
- ✓ **Mild-to-moderate exudating** ulcers, burn wounds, and donor sites
- ✓ On infected or necrotic wounds is **definitely contraindicated**
- ✓ Up to 5–7 days before changing
- ✓ The frequency of changing dressings it depends on the appearance of the ulcer

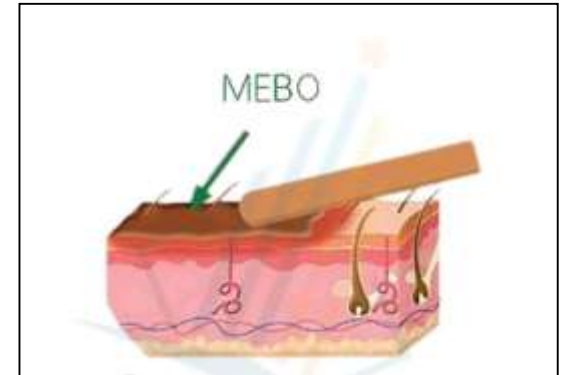




Herbal-Based/Ointment-Type Dressings

✓ MEBO

Indications: Burns, ulcers, donor sites, radiation injuries.



✓ Honey-Based Dressings

Properties: Antimicrobial, anti-inflammatory, promotes autolytic debridement.

✓ Calendula Ointment

Minor wounds, abrasions, radiation dermatitis – mainly supportive care.

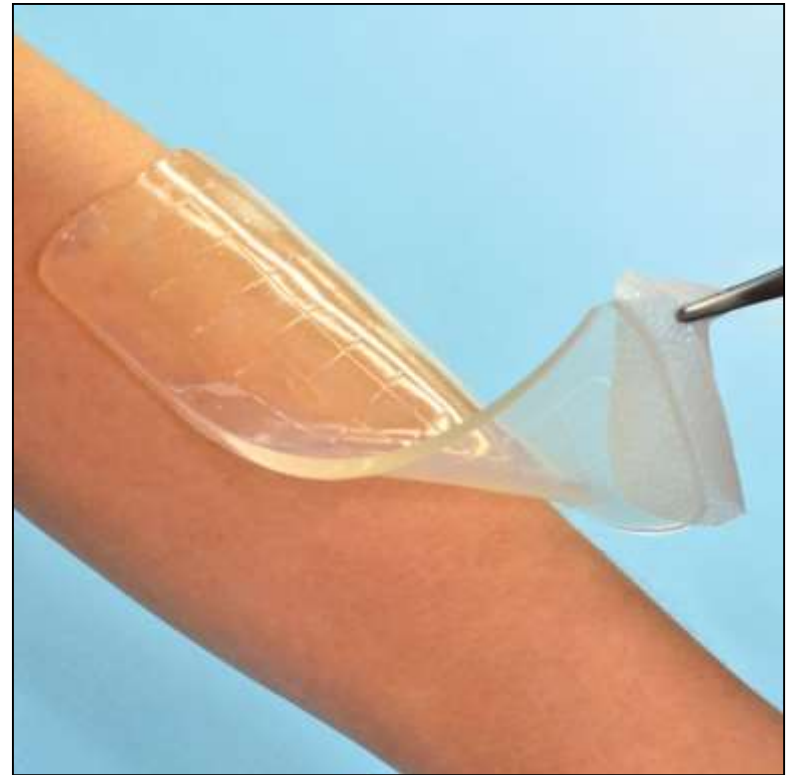
✓ Aloe Vera-Based Gels or Creams

First-degree burns, sunburns, minor wounds. Has soothing and anti-inflammatory effects.



Hydrogel

- ✓ Three-dimensional matrix of hydrophilic polymers, such as carboxy-methylcellulose or polyethylene oxide, combined with a high (usually more than 90%) water content.
- ✓ Hydrogel dressings may be applied to ulcers that present white or yellowish slough on their surface
- ✓ Autogenous enzymes released by dead or damaged tissue disintegrate
- ✓ Maintains a Moist Wound Environment
- ✓ **Promotes autolytic debridement** and supports cellular repair by hydrating dry tissue



Hydrogel

- ✓ **Ideal for Dry or Necrotic Wounds**
Provides moisture to rehydrate devitalized tissue and support autolytic debridement.
- ✓ **Promotes a Moist Healing Environment**
Helps reduce pain and facilitates granulation in wounds with minimal or no exudate.
- ✓ **Indicated in Burns, Radiation Injuries, and Painful Wounds**
Especially useful for first- and second-degree burns, shallow pressure ulcers, and painful ulcers.
- ✓ **Can Be Used with Secondary Dressings**
Often requires a cover dressing to maintain placement and optimize moisture balance.
- ✓ **Not Suitable for Heavily Exuding or Infected Wounds**



Enzymatic dressing

- ✓ Topical foam with proteolytic enzymes using foam of fruit juice (papaya and pineapple)
- ✓ On the 1960 the first scientific records was performed about the use of proteolytic enzymes in the treatment of chronic wounds.
- ✓ **It is a specific wound debridement** option using item in gel or ointment
- ✓ It can be used **when mechanical debridement is a contraindication** or are not available (home care service, patient's clinical condition and so on)
- ✓ Dry wounds are relative contraindication for the use
- ✓ Irritation of peri wound skin with discomfort and inflammation





Enzymatic dressing

- ✓ Proteolytic enzymes are used to hydrolyse peptide bonds, to facilitate the removal of necrotic tissue
- ✓ Collagenases are the only endoproteases that can degrade the human triple helical collagen
- ✓ Bacterial collagenase breaks the triple helix structure of collagens promoting the wound healing
- ✓ **Clostridium Peptidase A from Clostridium Histolyticum**
- ✓ It is not possible to cover with antiseptic dressing or soap because some enzymes become ineffective in the presence of these solutions



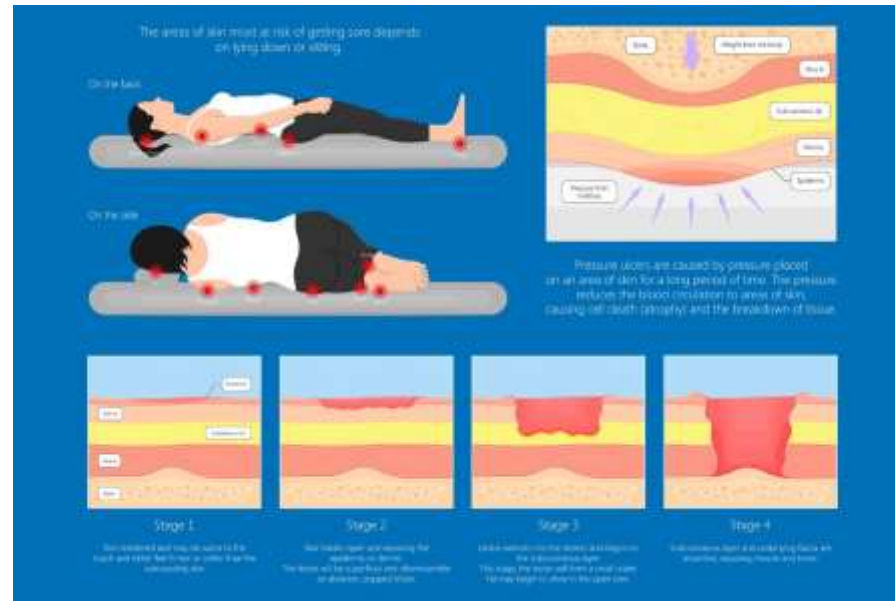
Foam

- ✓ Polymeric material such as polyurethane contain air bubbles
- ✓ The dressing material can absorb the fluids filling the air bubbles
- ✓ When air bubbles are filled by secretions, the foam cannot release it
- ✓ Occlusive or semi-occlusive
- ✓ Permeable to gases and water vapor
- ✓ The absorptive capacity is dependent on the thickness of the dressing
- ✓ Their use may be considered with secreting ulcers





Clinical case



<https://drsergiomazzei.health/pressure-injury-prevention/>

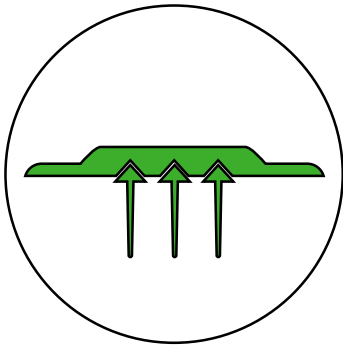


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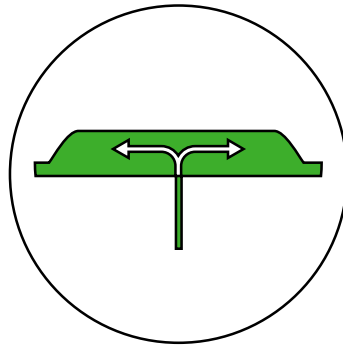
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Foam

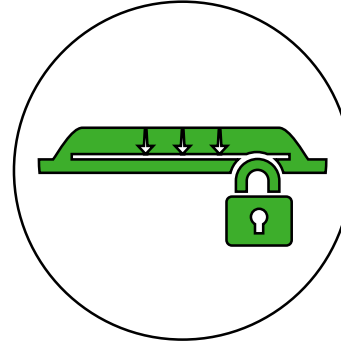
Different steps



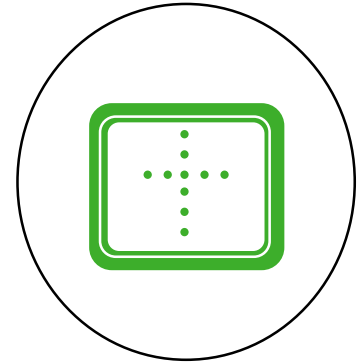
Rapid absorption



Exudate channelled



Bacteria trapped away from
the wound



Exudate tracked without
dressing removal

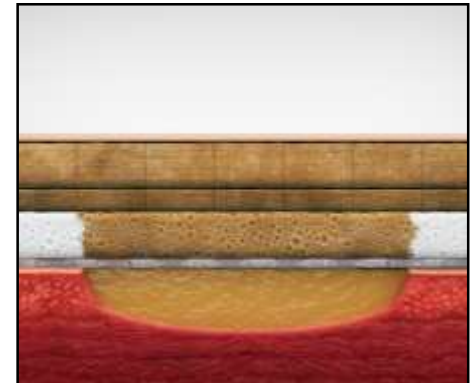
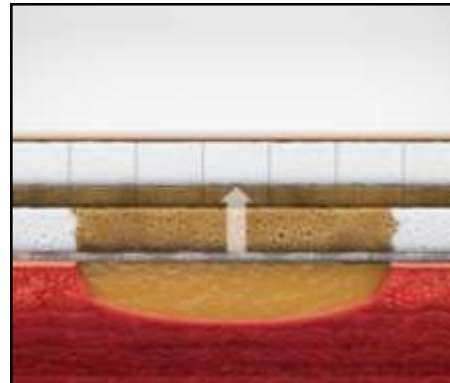
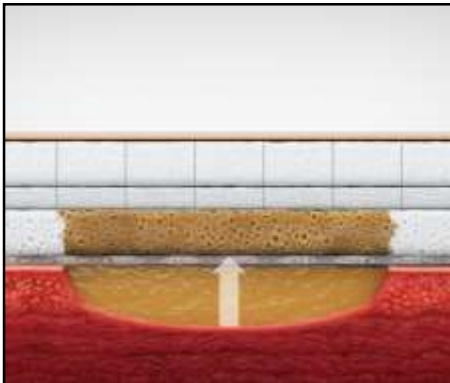
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Foam

Key work - Exudate channelled

Lateral dispersion maximises the absorption of the fluid capacity



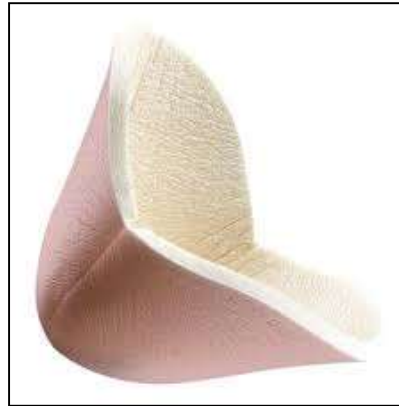
Lateral spread + breathable film = handling fluid capacity reducing maceration



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Alginate dressing

- ✓ Alginate dressings are made of polysaccharide fiber, containing alginic acids, derived from various species of seaweed
- ✓ The fibers absorb the ulcer exudate with the formation of a highly absorbent hydrophilic gel
- ✓ Alginate dressings are indicated for moderate-to-heavy exudating cutaneous ulcers
- ✓ It can contain Silver to control bacterial overgrowth

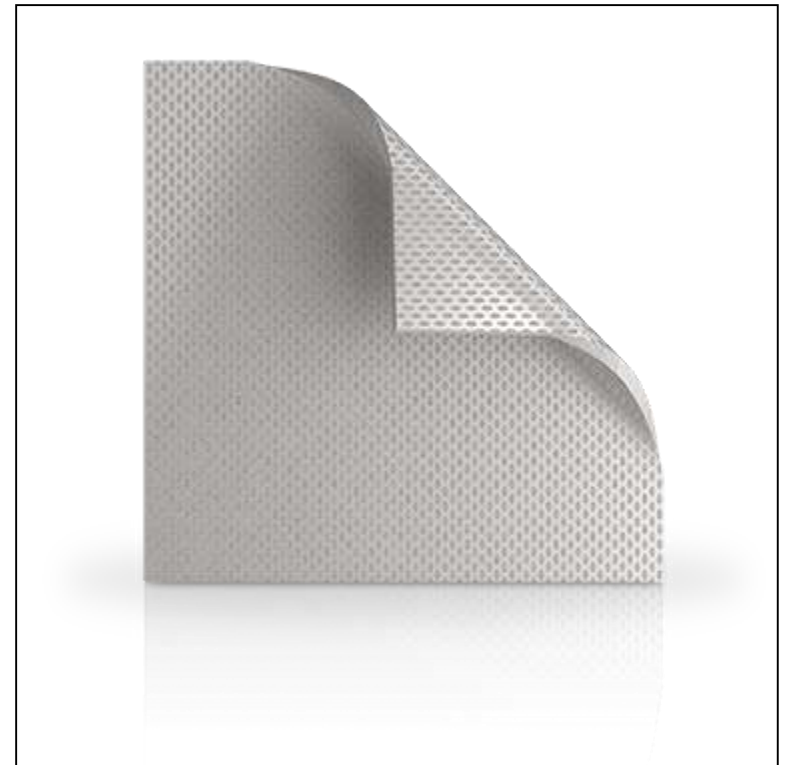


Alginate dressing

- ✓ Easy and pain-free removal
- ✓ Provides a sustained release of silver ions in vitro for up to 7 days
- ✓ Is effective against a broad spectrum of wound pathogens including MRSA, MRSE and VRE

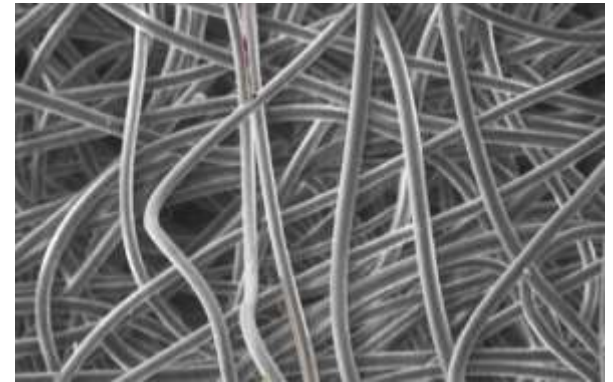
Hydro-alginate dressing

- ✓ It is a pad made of alginate and Carboxymethylcellulose (CMC) and silver coated nylon fiber
- ✓ Antimicrobial action
- ✓ High absorbency
- ✓ Easy and pain-free removal
- ✓ Protection of the newly formed tissue
- ✓ MRSA, MRSE and VRE



Hydrofiber

- ✓ A Hydrofiber is defined as a soft, sterile, non-woven pad or ribbon dressing composed of **sodium carboxymethylcellulose**
- ✓ Can absorb a large amount of wound fluid, such as exudate with bacteria
- ✓ The gel also aids the removal of non-viable tissue from the wound (autolytic debridement), without damaging newly formed tissue
- ✓ A moist wound environment to support healing with Excellent absorption and retention
- ✓ Protection for peri-wound skin
- ✓ Reduced maceration



Hydrofiber

- ✓ Reduced cross-contamination on dressing removal
- ✓ Balanced inflammatory response
- ✓ Absorb and contain wound fluid
- ✓ remove secretions from the wound bed and the peri-wound area
- ✓ Protecting from potential maceration
- ✓ contains fine silver sulphate crystals
- ✓ When exudate comes into contact with the dressing the crystals dissolve and release silver ions





Antiseptic dressing

Povidone-iodine (PVP-I)

- ✓ Broad spectrum antimicrobial action
- ✓ It has been proven to be effective against MRSA
- ✓ Minimizes adherence to the wound bed, therefore reducing the risk of damage to the granulation tissue at dressing removal
- ✓ Reduce pain for patients



Antiseptic dressing

Povidone-iodine (PVP-I)

- ✓ Dressing will change colour from orange to white.
- ✓ Indicator of how frequently dressings should be changed
- ✓ Improve cost effectiveness in treatment

Antiseptic dressing

Cadexomer iodine

- ✓ Cadexomer iodine consists of small polysaccharide beads (cadexomer starch) containing 0.9% iodine with highly absorptive properties
- ✓ Wound exudate swell the polysaccharide beads , allowing a slow sustained release of iodine into the wound



Antiseptic dressing

Cadexomer iodine

- ✓ Broad-spectrum antimicrobial including Methicillin Resistant Staphylococcus Aureus (MRSA)
- ✓ Minimal toxicity to cells
- ✓ Proven efficacy against biofilm
- ✓ promote autolytic debridement
- ✓ Can dehydrate and directly disrupt the biofilm structure
- ✓ Dressings should be changed 2–3 times a week, or more frequently, even daily, if the wound is heavily exuding

Antiseptic dressing

PHMB - polyhexamethylene biguanide

- ✓ **PHMB** is a synthetic polymer structurally similar to naturally occurring antimicrobial peptides (AMPs).
- ✓ Antimicrobial peptides (**AMPs**), also called host defense peptides (HDPs) are part of the innate immune response
- ✓ Gram negative and Gram positive bacteria, enveloped viruses, fungi and even transformed or cancerous cells
- ✓ It can enter bacterial cell membranes and kill bacteria in a similar way to AMPs



Antiseptic dressing

PHMB - polyhexamethylene biguanide

- ✓ PHMB is thought to adhere to and disrupt target cell membranes, causing them to leak potassium ions and other cytosolic components
- ✓ Binds to DNA and other nucleic acids damaging or inactivating bacterial DNA
- ✓ Good clinical safety
- ✓ No known risks of reabsorption
- ✓ Toxicity risks
- ✓ Low risk of contact sensitisation

Wound irrigation

- ✓ The decontamination of the wound is important for the wound healing
- ✓ Foreign objects
- ✓ Hypothermia
- ✓ Drying out
- ✓ Necrotic tissue
- ✓ Infection / critical colonization



Wound irrigation

Saline
solution

Sterile
water

Potable water/ Water
and soap

Hydrogen
peroxide

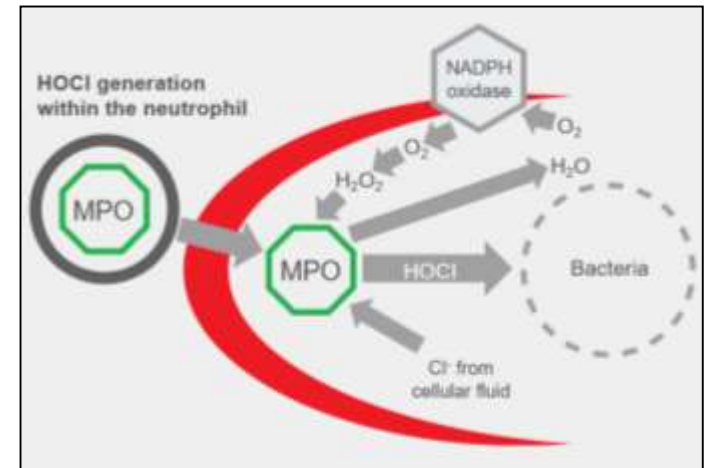
Povidone
iodine

Sodium
hypochlorite

Wound irrigation

Hypochlorous acid

- ✓ Hypochlorous acid was introduced in World War I to treat wound infection
- ✓ In Humans, HOCl is used to attack bacteria in the oxidative burst process:
 - Oxygen is converted to hydrogen peroxide by an enzyme
 - Another enzyme converts hydrogen peroxide and chlorine ions to HOCl



Wound irrigation

Hypochlorous acid

- ✓ It is a Hypotonic solution and can destroy the cell wall
- ✓ Hypotonicity leads to osmolysis
- ✓ LOW Irritation-Threshold
- ✓ Selective effect on cells
- ✓ Biocompatible
- ✓ No signs of cytotoxicity
- ✓ No signs of carcinogenicity
- ✓ No damage the tissues: cartilage, Mucosa and Peritoneum



Wound irrigation

super-oxidized solution

- ✓ It is a hypertonic and can destroy the cell wall
- ✓ Hypertonicity leads to osmolysis
- ✓ Sterile super-oxidized, pH-neutral, purified water-based solution
- ✓ To treat ulcers, wounds, cuts and burns
- ✓ It maintains the health of the surrounding tissue
- ✓ The wound should remain moistened with super-oxidized solution for 5-10 minute

Wound irrigation

super-oxidized solution

- ✓ Gram Positive, Gram Negative bacteria (including MRSA) Viruses, fungi and spores
- ✓ It can be used with all the usual positive and negative-pressure therapies
- ✓ Inhibits the degranulation of mast cells,
- ✓ Stop the release of inflammatory chemicals, such as cytokines & histamine.
- ✓ Promote fibroblast migration
- ✓ increase tissue oxygenation after 60 seconds of exposure to the wound bed
- ✓ No resistance
- ✓ Hypoallergenic

Debridement

*Removing adherent, death or
contaminated tissue from
wound*

Debridement

- *Necrotic material*
- *Eschar*
- *Devitalized tissue*
- *Serocrusts*
- *Infected tissue*
- *Hyperkeratosis*
- *Slough*
- *Pus*
- *Hematomas*
- *Foreign bodies*
- *Debris*
- *Any other type of tissue*



*To promote wound
healing*

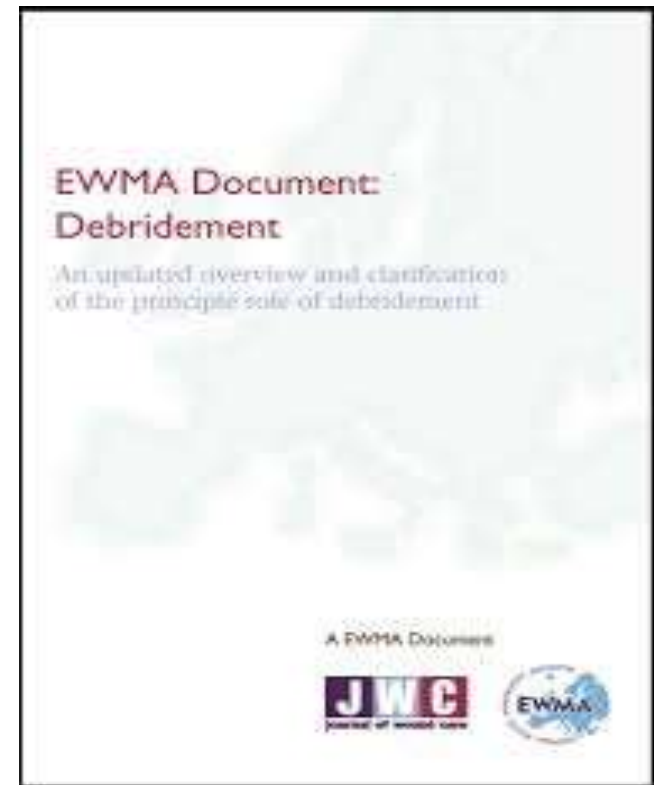
Indication

- The technique does not relate with the diagnosis of the wound
- Appropriate diagnosis must define the problem (necrosis, eschar, etc)
- It is a central step in the wound management



Debridement

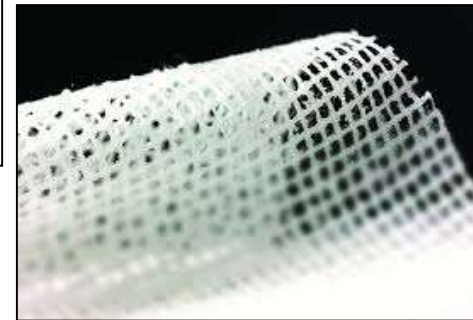
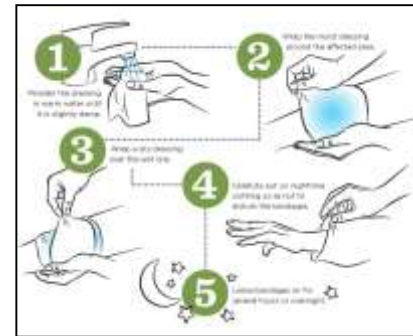
- Mechanical debridement
- Autolytic
- Enzymatic dressing
- Larvae debridement (Maggot Therapy)
- Direct debridement (hydro surgery and ultrasound)
- Indirect debridement (NPWT and low-frequency ultrasound)
- Surgical and sharp debridement





Mechanical debridement

- Wet-to-dry debridement
- Paraffin gauze
- Gauze
- Monofilament fibre pad





Mechanical debridement

Wet-to-dry debridement

- It was reported to be most used debridement technique in USA
- A moist gauze pad is applied to the wound.
- The devitalized tissue dries and re hardens to the gauze
- The dressing is removed and the adherent material is pulled free
- It is recommended only as short-term therapy for infected necrotic wound



Mechanical debridement

Wet-to-dry debridement – Limitation

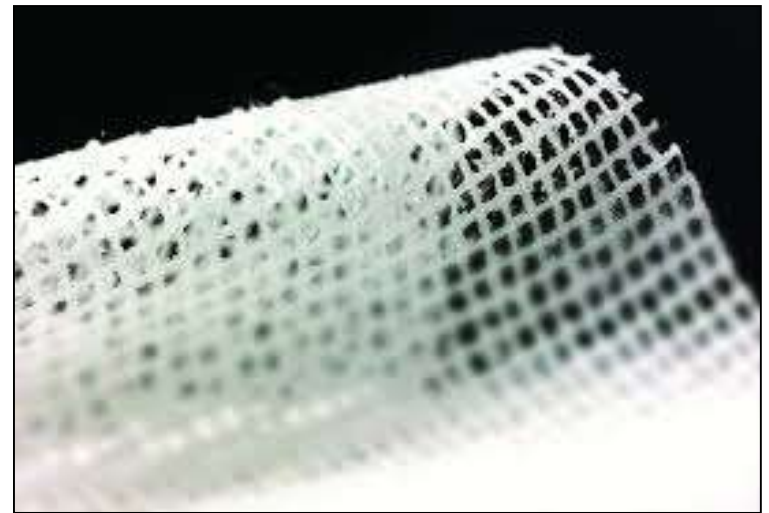
- Increase the risk of infection
- The gauze can leave foreign bodies on the bed of the wound
- Damage the normal tissue
- Painful



Mechanical debridement

Paraffin gauze

- Causing pain
- Damage the new tissue
- Bleeding removing the gauze
- Increase the risk of infection
- Delay the re-epithelization





Mechanical debridement

Gauze

- It has been used as a basis dressing in wound management
- Painful
- Frequently change dressing, requiring staff resource





Mechanical debridement

Monofilament fiber pad

- Recently introduced
- Gently wiped over the surface up to 5 minutes
- Debriding different kind of wound
- Different kind of tissue
- Leave healthy granulation tissue intact
- Some pain following the debridement





Autolytic debridement

- It describes a natural process in the wound
- It uses the body's own enzymes and moisture to re-hydrate, soften and finally liquefy hard eschar and slough
- It is painless for the patient
- It can be achieved with the use of occlusive or semi-occlusive dressing
- It included hydrogel and hydrocolloids

Autolytic debridement

Contraindication and side effect

Hydrogel:

- Bleeding wound
- Fistula
- Cavity
- Highly exudate
- Maceration peri wound skin
- Infection

Hydrocolloid:

- Diabetic patients or infected wound
- Risk of infection due to maceration of the skin
- Eyes, mucosal membrane or cavity



Enzymatic debridement

- Specific enzymatic debridement using proteolytic enzymes
- Gel or ointment
- Contraindication for mechanical debridement
- It hydrolyze peptide bonds to facilitate removal non vital tissue
- Collagenase from clostridium histolyticum
- Easy and safe to use
- Dry wounds are contraindicated
- Using additional antiseptic, some enzyme become ineffective



Larvae debridement – Maggot therapy

- It is a mechanical debridement
- *Lucilia sericata* (common green bottle fly)
- Used during the First World War
- Decreased after antibiotic therapy
- Maggot secretions contain antibacterial substantia (allantoin, urea, phenylacetic acid and others)
- MRSA (+) *Pseudomonas*, *Proteus* and *E. Coli* (-)
- Stimulation the healing process

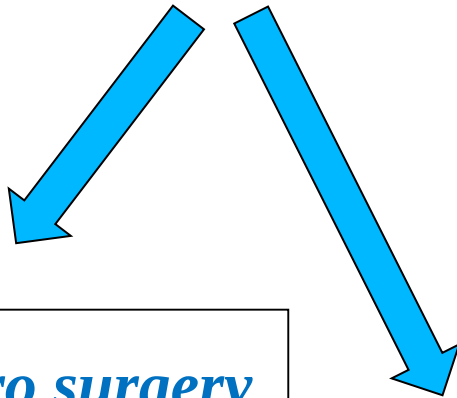




Technical solution to debride

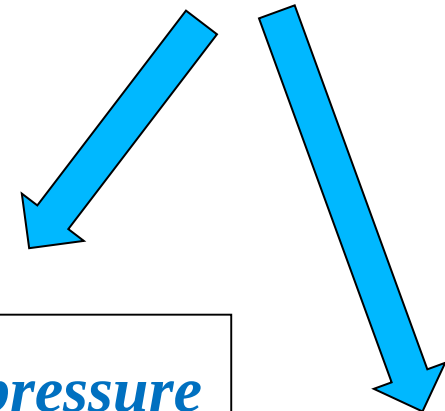
Direct debridement technologies

Indirect debridement technologies



Hydro surgery

Ultrasound



Negative pressure

Low-frequency ultrasound

Hydro surgery

- Preserves viable tissue
- Reduced bacterial burden
- Removes unwanted necrosis
- Improved graft and synthetic dressing results
- Minimized peripheral tissue damage
- Reduced number of debridement
- Reduced healing time
- Compared to conventional methods, reduced repeat procedures
- Reduced treatment cost

Ultrasound

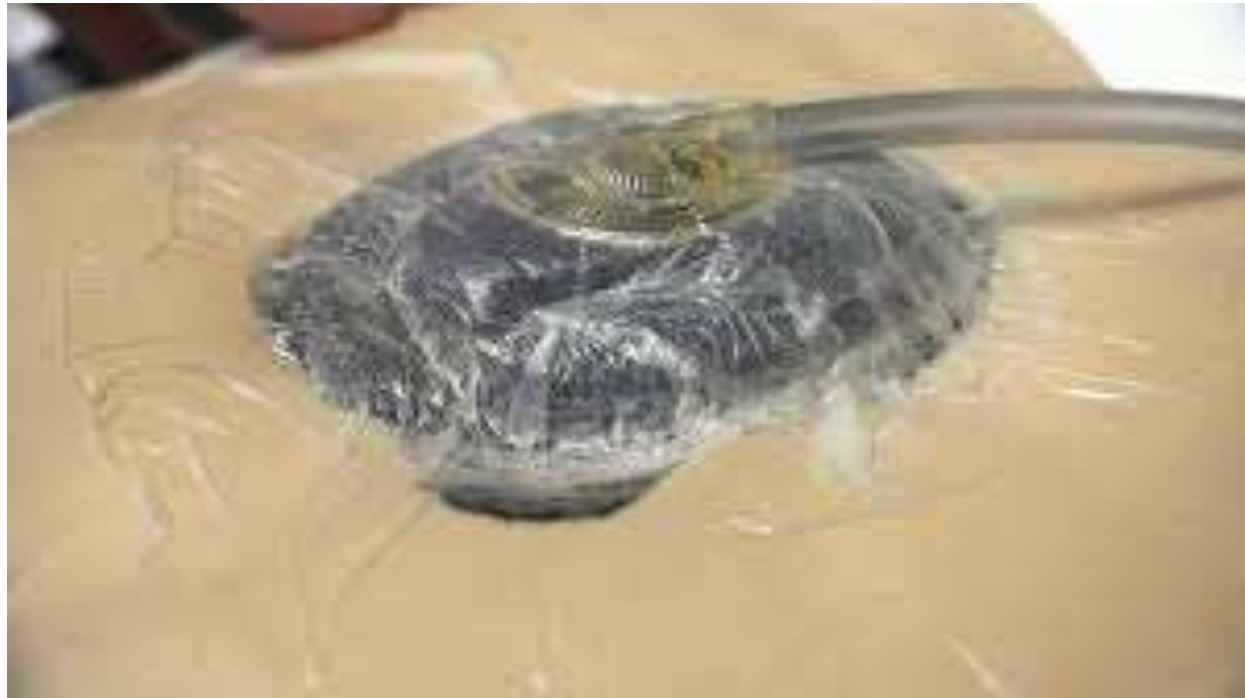
- Range of ultrasound (Megahertz)
- Different applications (surgical cutting, coagulation and debridement)
- Interfere with the proteins
- Preservation of health tissue
- **Disruption of biofilm**
- Gentle method to clean the wounds
- It can be controlled by physician
- It is possible to modulate the intensity of the device
- Nebulization of the material (protection for the staff)



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Negative pressure



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Benefits of Negative Pressure Wound Therapy

- ✓ **Promotes Wound Healing**
Enhances blood flow, reduces edema, supports granulation
- ✓ **Reduces Infection Risk**
Sealed environment prevents external contamination
- ✓ **Optimizes Wound Bed Preparation**
Brings edges together, prepares for grafts/closure
- ✓ **Minimizes Dressing Change Frequency**
Increases comfort, reduces healthcare workload
- ✓ **Effective for Complex & Chronic Wounds**
Ideal for diabetic, venous, pressure, and surgical wounds

Negative pressure

- ✓ **Accelerates Wound Healing** Promotes faster tissue regeneration by enhancing blood flow and granulation tissue formation
- ✓ **Reduces Edema and Exudate** Efficiently removes excess fluid and decreases swelling, creating an optimal healing environment.
- ✓ **Minimizes Risk of Infection** Creates a sealed, controlled environment that limits bacterial contamination.
- ✓ **Improves Wound Edge Approximation** Gently pulls wound edges together, aiding in wound closure
- ✓ **Enhances Patient Comfort and Mobility** Less frequent dressing changes and portable devices



Surgical and sharp debridement

- Rapid Methods as surgical procedure
- Cutting away the tissue, slough and necrotic tissues
- Can damage the vessels, nerves, resulting in bleeding or loss of functions
- Any kind of specialist
- Bed patient or Outpatient Department
- May be limited to necrotic tissue

Surgical and sharp debridement

- The wound should be prepared using antiseptic solutions
- Sterile instruments (blade, scissors, forceps)
- Sterile surgical camp
- Local anesthesia, nerve block, sedation, general anesthesia



Surgical and sharp debridement

Benefit and contraindication

- Fast removal of the death tissue
- When other technique failed
- Possible to have reconstruction
- Increasing healing rates
- No selective method
- Over excised wounds
- Poor general condition of the patient
- Bleeding



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