Acute Wounds

There are principally two kinds of acute wounds

Traumatic

A traumatic wound includes injuries such as lacerations, abrasions, bites and burns, contusion injuries and puncture wounds.

Management of a severe traumatic wound initially involves emergency procedures e.g.

- Resuscitation and restoration of the circulation to the affected limb/area
- Associated injuries should be considered.
- The blood supply must be optimised and any necrotic tissue debrided as this can act as a focal point for bacteria
- Irrigate the wound and remove debris
- Antibiotics and tetanus are usually given prophylactically

Surgical Incisions

PRIMARY CLOSURE: where a surgical wound is incised and either sutured/ stapled or glued.

DELAYED PRIMARY CLOSURE: surgical wounds which are contaminated or infected, are sometimes left open post surgery whilst the infection resolves and then they are sutured closed at a later date.

SECONDARY CLOSURE: Wounds laid open to heal by secondary intention.

Adequate pain control and appropriate dressing selection can greatly affect the outcome for the patient e.g. time to heal, the scar and quality of life.

If pain is not controlled adequately it can:

- Decrease oxygen uptake
- Delay patient mobility & increase hospital length of stay
- Increase mortality & morbidity

For acute wounds dressing selection should be based upon:

- Absorbing wound exudate
- Protecting the wound from infection
- Supporting homeostasis
- Patient comfort

References: 1 Leaper DJ and Harding KG. (1998) Wounds: Biology and Management. Oxford University Press.

Acute Wound Closure

Primary closure	Synthesis, deposition and cross-linking of collagen and other matrix proteins provide tissue with strength and integrity	Tissue adhesives (glues) may also be used for small wounds or incisions
Delayed primary closure	This is done to prevent infection in wounds where there is significant bacterial contamination, the presence of foreign bodies or extensive tissue trauma	The wound undergoes primary healing with deposition of scar tissue in the centre of the wound. Tensile strength is eventually the same as with primary closure
Secondary or wounds laid open to heal by secondary intention	Partial thickness wounds heal by epithelialisation	Failure of the wound to close may lead to a chronic wound

Classification of surgical wounds

Class I - Clean

A clean wound is an aseptically-made wound such as an uninfected operative wound in which no inflammation is encountered and the alimentary, respiratory or genito-urinary tracts have not been entered.

Class I wounds are primarily closed and may be drained with closed drainage.

Class II – Clean-contaminated

A clean/contaminated would is an aseptically made wound that enters the respiratory, alimentary or genitourinary tracts.

Class II wounds result from surgical operations involving the biliary tract, appendix, vagina, oropharynx etc.

Class III - Contaminated

Contaminated wounds are open (avulsive), fresh, accidental wounds or wounds from surgical operations involving major breaks in sterile technique or gross spillage from the gastrointestinal tract.

Class III wounds have been exposed to excessive amounts of bacteria.

Class IV - Dirty-infected

A dirty-infected would is one that retains devitalised tissue or involves preoperatively existing infection or perforated viscera.

Class IV wounds are often left open to drain. (Angood et al, 2001)

References: Devaney L, Rowell K, (2004); Improving surgical wounds classification – why it matters. AORN Journal;
Vancouver Island Health Authority, (2007) Wound & Skin Care Clinical Guidelines. chap 8.

Insect bites and stings

Insect bites and stings can be simply divided into two groups: Venomous and non-venomous. A sting is usually from an attack by a venomous insect such as a bee or wasp which uses this as a defence mechanism by injecting toxic and painful venom through its stinger. Non-venomous insect bites pierce the skin to feed on your blood which usually results in intense itching.

Venomous (stingers)


Honey bee


Yellow Jacket


Wasp


Hornet


Fire ant


Spiders

What causes insect bites and stings?

If the reaction is mild, insect stings should be treated by first removing the stinger. This is necessary as the stinger continues to pump venom from its sack until it is empty or removed.

- The stinger should be removed by using a firm edge such as a knife or credit card that is placed against your skin next to the embedded stinger.
- Apply constant firm pressure and scrape across the skin surface to remove the stinger. This is preferred to using tweezers or fingers which can accidentally squeeze more venom into the patient.
- The site should be cleaned with a disinfectant and an ice or cold pack applied to reduce the pain and swelling.
- Topical steroid cream or calamine lotion may be applied several times a day until the symptoms subside.
- If necessary oral antihistamines can also be taken.

The main treatment aim of insect bites is to prevent itching. Topical and oral antihistamines, calamine lotion and topical local anaesthetic agents may provide relief.

As generally only brief treatment is required. Moderate potency topical steroids may also be used to provide a longer effect.

Bites from insects carrying disease usually require specific antimicrobial therapy to treat the disease.

If an insect sting causes a severe reaction or anaphylaxis URGENT MEDICAL ATTENTION should be sought. If a patient is known to have an allergy to insect stings they may carry with them an allergy kit containing adrenaline (epinephrine). This can be used in such circumstances and may prove to be life saving. A medic alert tag is a wise precaution for those at risk from anaphylaxis.

In case of poisoning in New Zealand 24/7, call: 0800 764 766

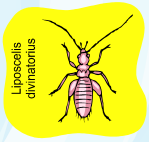
http://poisons.co.nz/

Non-venomous (biters)

Mosquitoe 

Flea 

Tick 

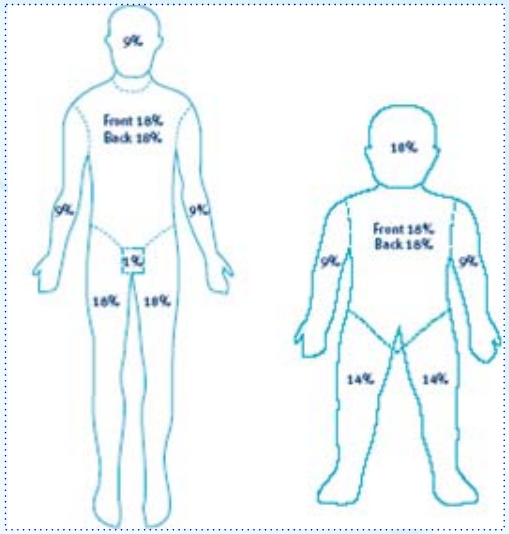
Lice 

Caterpillars & Moths 

Bed bugs and scabies

Burns

Burns are injuries to tissues caused by heat, friction, electricity, radiation or chemicals. Treatment depends on the SIZE, DEPTH and SITE.
It is essential to take a history of the burn that includes mechanism, when and how long for, and prior treatment or first aid details.



- The severity of the burn is also judged by the amount of body surface area (BSA) involved.
- The rule of nines is applied to determine the percentage of total body surface area burned. Other factors influence the level of treatment needed including associated injuries such as bone fractures and smoke inhalation, presence of a chronic disease or a history of being abused. Also children and the elderly are more vulnerable to complications from burn injuries and require more intensive care.

Note: For more information this chart refer to:
"Management of Burns and Scalds in Primary Care" from ACC website: **http://www.acc.co.nz**

FIRST AID FOR BURNS

- Remove constricting clothing not stuck to the burn site
- Remove jewellery and watches
- Cool with running tap water for at least 20 minutes
- Do not use ice or cause hypothermia (keep the person as warm as possible)
- Cooling still useful up to 3 hours post burn injury
- Avoid topical treatment until the burn depth as been assessed

CLASSIFICATION

DEGREE OF BURN

- **First degree** → **Causes redness and swelling in the outermost layers of the skin (epidermis burn involves redness, swelling and blistering)**
- **Second degree** → **The damage may extend beneath the epidermis to deeper layers of skin (dermis)**
- **Third degree** → **Also called a full thickness burn; destroys the entire depth of skin causing significant scarring. Damage also may extend to the underlying fat, muscle or bone**

Classification of Burns based on depth

ANZBA 2004 classification	Epidermal
Former classification	Superficial epidermal
Example	UV light, very short flash
Appearance	Dry and red, blanches with pressure, no blisters
Sensation	May be painful
Healing time	Within 7 days
Scarring	No scarring

ANZBA 2004 classification	Superficial dermal
Former classification	Superficial partial thickness
Example	Scald (spill or splash) short flash
Appearance	Pale pink with fine blistering, blanches with pressure
Sensation	Usually extremely painful
Healing time	Within 14 days
Scarring	Can have colour match defect. Low risk of hypertrophic scarring

ANZBA 2004 classification	Mid dermal
Former classification	Partial thickness
Example	Scald (spill) flame, oil, grease
Appearance	Dark pink with large blisters Capillary refill sluggish
Sensation	Can be painful
Healing time	14 – 21 days
Scarring	Moderate risk of hypertrophic scarring

Classification of Burns based on depth

ANZBA 2004 classification	Deep dermal
Former classification	Deep partial thickness
Example	Scald (spill) flame, oil, grease
Appearance	Blotchy red, may blister, no capillary refill In child may be dark lobster red with mottling
Sensation	No sensation
Healing time	Over 21 days: grafting probably needed
Scarring	High risk of hypertrophic scarring

ANZBA 2004 classification	Full thickness
Former classification	Full thickness
Example	Scald (immersion), flame, steam, oil, grease, chemical, high volt electricity
Appearance	White, waxy or charred, no blisters, no capillary refill May be dark lobster red with mottling in child
Sensation	No sensation
Healing time	Does not heal spontaneously, grafting needed if >1cm
Scarring	Will scar

Burns – Referral Criteria

The following criteria are endorsed by the ANZBA in assessing whether burns require treatment in a specialised burn unit:

Specialist Burns Unit

- ✓ **Burns greater than 10% of total body surface area (TBSA)**
- ✓ **Burns of special areas – face, hands, feet, genitalia, perineum and major joints**
- ✓ **Full thickness burns greater than 5% of TBSA**
- ✓ **Electrical burns**
- ✓ **Chemical burns**
- ✓ **Burns with an associated inhalation injury**
- ✓ **Circumferential burns of the limbs or chest**
- ✓ **Burns in the very young or very old**
- ✓ **Burns in people with pre-existing medical or psychological disorders that would complicate management, prolong recovery or increase mortality**
- ✓ **Burns with associated trauma**

Hospital Care

Burns of lesser severity than those meeting the criteria for regional urns unit care but with one or more of the following factors:

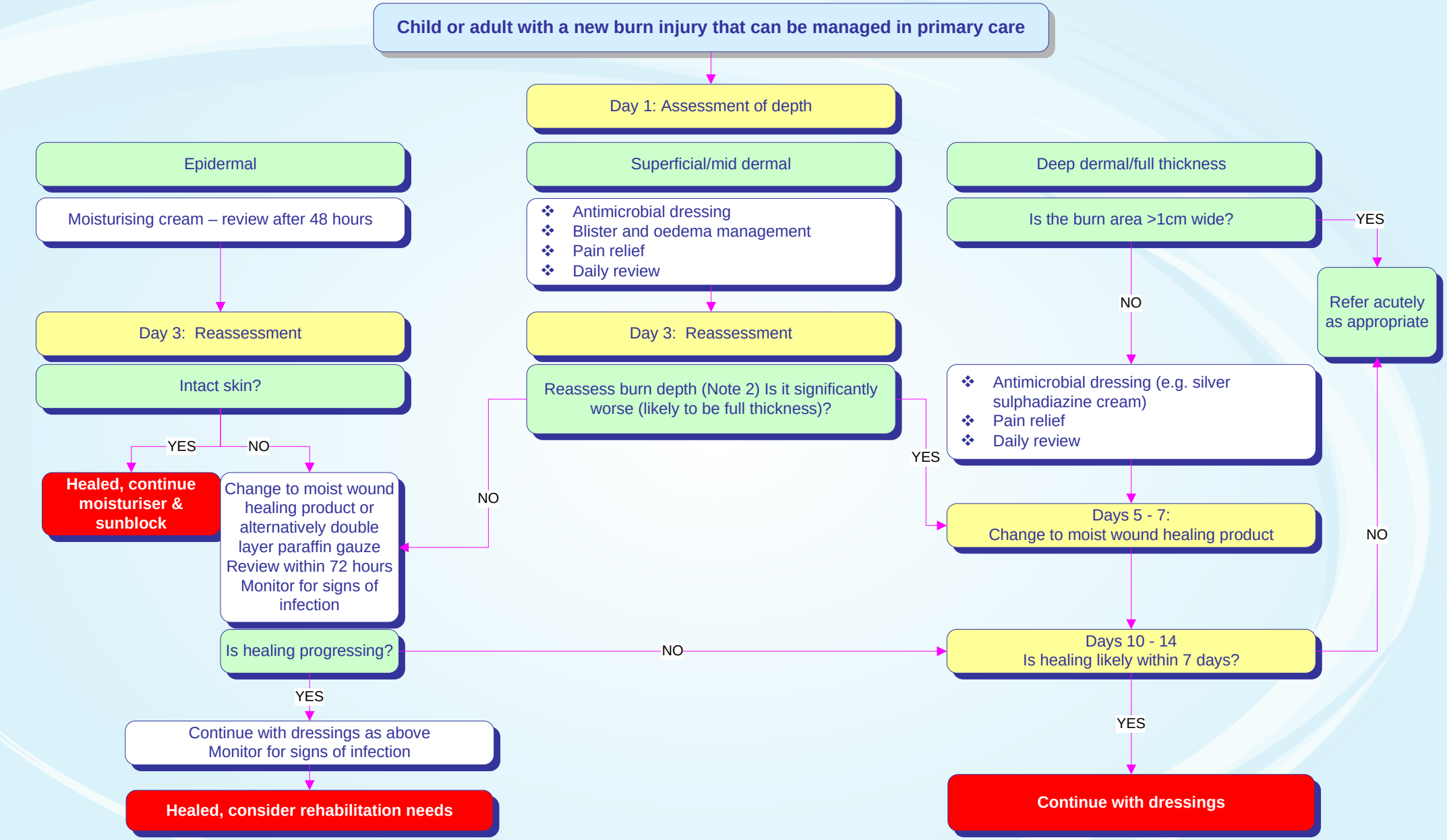
- ❖ **Ongoing requirements for narcotic analgesia or failure to manage dressing-change pain**
- ❖ **IV fluids required**
- ❖ **Where oedema may be a problem**
- ❖ **Social and/or psychosocial indicators**
- ❖ **Suspected non-accidental injury**
- ❖ **Frequent or complex dressing issues**
- ❖ **Significant co-morbidities**
- ❖ **Request for other specialist services e.g. physiotherapy**
- ❖ **Eye injury – refer to Ophthalmologist**

Follow locally developed protocols between centres on whom to transfer and when to transfer

When transferring

- Cover with clean dressing or cling wrap which is pliable, non-adherent and impermeable – this acts as a barrier and is transparent for inspection and reassessment by the hospital
- Ensure layers are NOT circumferential
- Ensure the patient receives adequate pain relief

Burns – Management Algorithm



Management – Primary Care

Wound care

Most burn wounds are initially sterile. Careful aseptic wound care procedures along with the use of antimicrobial cream for the first 3 days are generally sufficient to prevent infection.

- The wound should be regularly monitored as infection can delay healing, increase scarring and potentially cause systemic infection
- Review daily for the first 3 days then every 3 days
- Apply antimicrobial dressing e.g. silver sulphadiazine for the first 72 hours after injury
- If signs of mild cellulitis present, treat with oral antibiotics
- If signs of serious or systemic infection refer to secondary care
- After 72 hours, if there is no sign of infection change to moist wound healing products to encourage re-epithelialisation
- Avoid use of silver sulphadiazine cream for more than 7 days in non infected burns

Scarring

Any burn that does not heal within 21 days is likely to scar and can result in functional disability and appearance changes. These are indications for specialised care.

Burn injury may result in skin contracture which leads to tissue shortening and a decreased range of movement and loss of function. Management starts in the acute phase and continues until scar maturation which may take up to 2 years.

Pain management

Background pain associated with injury:

- Paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs), alone or in combination with opioids
- Aspirin products should be avoided

Intermittent or procedural pain:

- Consider administering short acting opioids
- Supplement pharmacological therapy with non-pharmacological approaches
- Refer to secondary care if failing to manage dressing change plan

Http://www.who.int/cancer/palliative/painladder/en/index.html

Blisters

- Preferably leave small blisters intact unless likely to burst or interfere with joint joint movement
- If necessary drain fluid by snipping a hole in the blister

Interventions

- Splinting
- Positioning
- Exercise
- Massage
- Silicon gel sheeting
- Pressure garments

Aftercare

- Follow advice from wound care team
- Use moisturizers and non drying, non perfumed soap to protect the skin
- Avoid tight clothing
- Examine skin daily for signs of breakdown or blisters
- Extra care to protect from sun exposure – use sunscreen plus/or protective clothing

Self care

- Due to the risk of infection bathe daily in the shower
- Clean the bathing area before and after each use. Avoid harsh chemicals.
- Use mild non drying, non perfumed soap
- Wash off any build up of creams and lotions
- Pat dry do not rub

Reference: Adapted or quoted from: Management of Burns and Scalds in Primary Care, New Zealand Guidelines Group

Dressings for Burn Management

Name Examples	Indications	Advantages	Disadvantages	Wear time
Semi-permeable Films *E.g. Opsite, Flexigrid, Tegaderm*	Superficial burns Burns with little or no exudate	As protection for fragile compromised areas of unbroken skin Impermeable to bacteria and contaminants Supports autolytic debridement Allows visualisation of the wound No secondary dressing required	Not recommended for exudating burns or new burns Requires dry border to adhere Can be difficult to handle May not stay in place in areas of moisture	1-3 days
Low adherent dressings *E.g. Jelonet, Cuticerin, Atrauman, Mepilex, Mepital*	Burns with minimal exudate Grafts when healing well	Covers and protects Non-sensitising Non-irritant	Limited moisture retention May cause trauma on removal Requires a secondary dressing to keep it in place and maintain moisture balance	24–48 hours
Hydrocolloids *E.g. Comfeel, Comfeel Plus, DuoDERM,*	For burns with light to moderate exudate Sloughy and necrotic burns	Can help with autolytic debridement Self-adhesive and moulds well Impermeable to bacteria and contaminants No secondary dressing required Maintains moisture balance	Not recommended for heavily exudating burns, sinuses or tracts May tear fragile surrounding skin on removal Dressing odour can be offensive Gel can be mistaken for pus	3-7 days
Hydrogels *E.g. Intrasite, Solosite, Purilon*	For necrotic and sloughy burns Deep-cavity burns with necrosis and slough and light exudate	Rehydrates the wound bed Aids autolytic debridement Fills dead space in cavity burns Small amount of absorptive reaction Can be soothing and reduce pain	Not recommended for moderate or heavily exudating burns Can macerate wound edges if not carefully applied Can soak into some secondary dressings Requires secondary dressing	1-2 days

Dressings for Burn Management

Name Examples	Indications	Advantages	Disadvantages	Wear time
Alginates *E.g. Kaltostat, Algisite, Seasorb*	For partial and full thickness burns with moderate to heavy exudate Wounds with undermining or sinus tracts Wounds with necrotic tissue with exudate Infected wounds	Absorbs 20 times its own weight Forms a gel over wound Supports debridement Fills dead space (comes in wicks as well as sheets) Easy to remove if gelled Easy to use and cut to fit	Not recommended for lightly exudating wounds or wounds with eschar (a dry scab or slough) If dries out can be difficult to remove Requires a secondary dressing	1-4 days
Hydrofibres *E.g. Aquacel, Versiva*	Partial thickness burns Moderate to heavily exudating burns	Absorbs 25 times its own weight Vertically wicks fluid therefore controls lateral spread of exudate Can fill dead space (comes in5wicks as well as sheets) Tensile strength comparable to gauze Forms a gel over wound Reduces maceration of surrounding skin Easy to use and cut to fit Easy to remove if gelled	Not recommended for burns with eschar Requires a secondary dressing to secure it Not recommended for dry burns – will adhere to a dry wound	1–14 days
Foams *E.g. Allveyn, Lyfoam*	Partial and full thickness burns with minimal to moderate exudate	Secondary dressing to provide additional absorption Non-adherent Does not cause trauma on removal Easy to use and apply May be used under compression	Not recommended for burns with little or no exudate May macerate surrounding skin if it is not protected Needs to be taped if it is in non-adhesive form	1-5 days

Dressings for Burns Management and References

Name Examples	Indications	Advantages	Disadvantages	Wear time
Antimicrobial Different products act differently at the wound bed as per dressing type, e.g., hydrofibre or wound contact dressing *E.g. Acticoat, Aquacel AG, Inadine*	Partial and full thickness burns Burns that appear to be infected	Generally absorbs exudate Delivers antibacterial/ antimicrobial component to wound bed – effective against gram-positive and gram-negative bacteria, fungal infections	Not recommended for dry burns or burns with eschar Manufacturer's instructions need careful consideration prior to application depending on product chosen Requires secondary dressing to secure	1–14 days Depending upon Product chosen
Silver creams *E.g silver sulphadiazine*	Partial and full thickness burns Dry eschars Infected burns	Maintains moisture balance Antibacterial/Antimicrobial to multiple organisms Antibacterial effect penetrates eschar Aids in autolytic debridement Comfortable for person Easy to apply Non-absorptive	Can cause its own pseudo eschar which can be difficult to remove Prolonged use is detrimental to wound cells and can delay healing Requires a secondary dressing	Daily dressing required

Adapted from: NZGG Burns guidelines: http://www.nzgg.org.nz/guidelines/0139/Burns_full.pdf and Yapa K, Enoch S. Management of burns in the community.2009*, Wounds UK 5, 2,38-48.*

LINKS:	Australia New Zealand Burn Association	www.anzba.org.au/
	"Management of Burns & Scalds in Primary Care" from ACC website	www.acc.co.nz
	NZGG website	www.nzgg.org.nz