



Wound Care Education

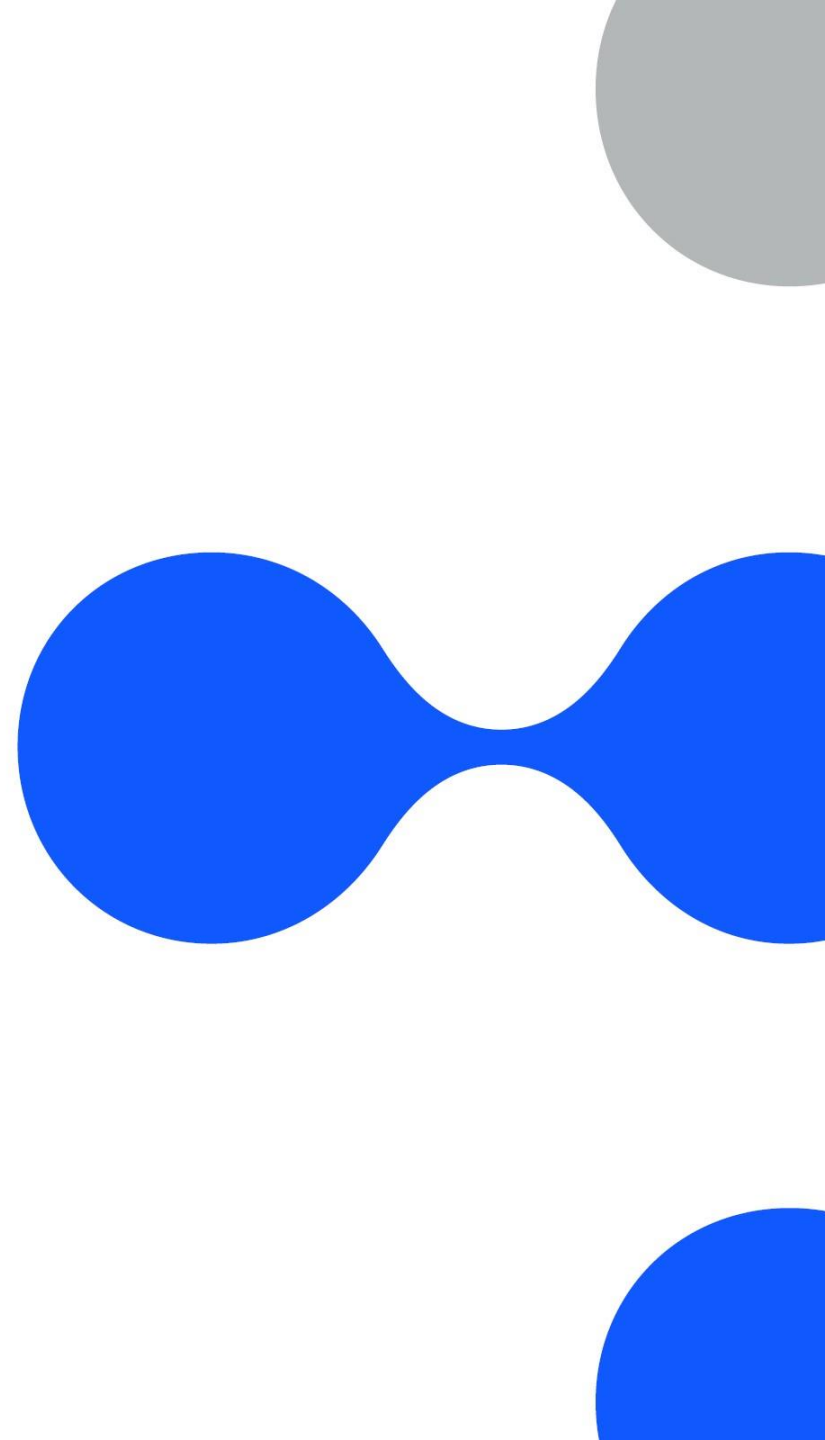
Wound assessment and management

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Care Coordinator

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Acknowledgement of Country

Silverchain respectfully acknowledges the Traditional Custodians of the lands on which we work and live. We acknowledge Elders both past and present, whose ongoing effort to protect and promote Aboriginal and Torres Strait Islander cultures will leave a lasting legacy for future leaders and reconciliation within Australia.



Aim of this presentation

Learning outcomes

- Identify layers and functions of the skin.
- Describe the difference between an acute and chronic wound.
- Discuss phases of normal wound healing.
- Assessment of a wound using the TIME principle.
- Describe the aetiology and management of common types of acute and chronic wounds.
- When and who to refer to for further management.
- Points to remember.

Wound care education

GP statistics

- In 2010/11, wound dressings were the second most frequently recorded procedure in General Practice, and the second most common procedure performed by practice nurses.
- In 2021, 93% of practice nurses undertook wound management tasks either weekly or daily.
- Approximately 450,000 Australians currently live with a chronic wound, directly costing the Australian healthcare system around AU\$3 billion p.a.

Wound care education

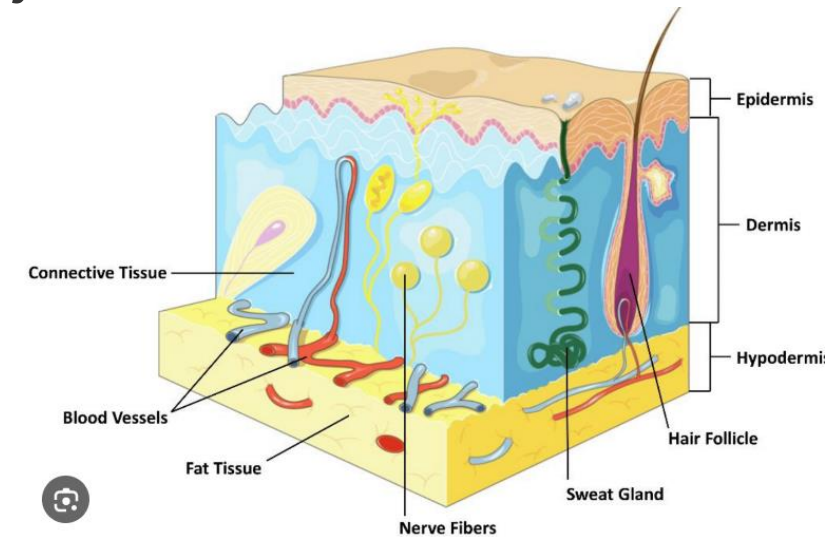
Medicare Benefits Schedule Review Taskforce

- The recommendations from the Wound Management Working Group (Working Group) were released for public consultation in November 2019.
- Report from the Wound Management Working Group
- June 2020

Wound care education

Functions of the skin

- Skin is the largest organ of the human body
- It covers the body entirely and is comprised of 3 layers
- Epidermis
- Dermis
- Hypodermis or subcutaneous tissue
- Barrier to toxic substances
- Thermoregulation
- Protects against infection



Skin

Integumentary System

Statistics: 1 square cm of skin contains

- 15 sebaceous glands
- 1 metre of blood vessels
- 100 sweat glands
- 3000 sensory cells at the ends of nerve fibres
- 4 metres of nerves
- 200 nerve endings to record pain
- 2 sensory apparatus for cold and 12 for heat
- 300,000 epidermal cells
- 10 hair follicles.

What is a wound?

What is the definition of a wound in wound care?

“Any disruption to the integrity of the skin, mucous membrane or organ tissue.”

Definition of a wound

A wound is a break in the integrity of the skin that is described as consisting of three distinct parts:

- wound bed
- wound edge
- peri-wound

The peri-wound is defined as the 10cm area beyond the wound edge.

Rippon et al 2022



Phases of wound healing – 1st phase

Haemostasis – can last for 2 days

Haemostasis marks the first stage of wound healing

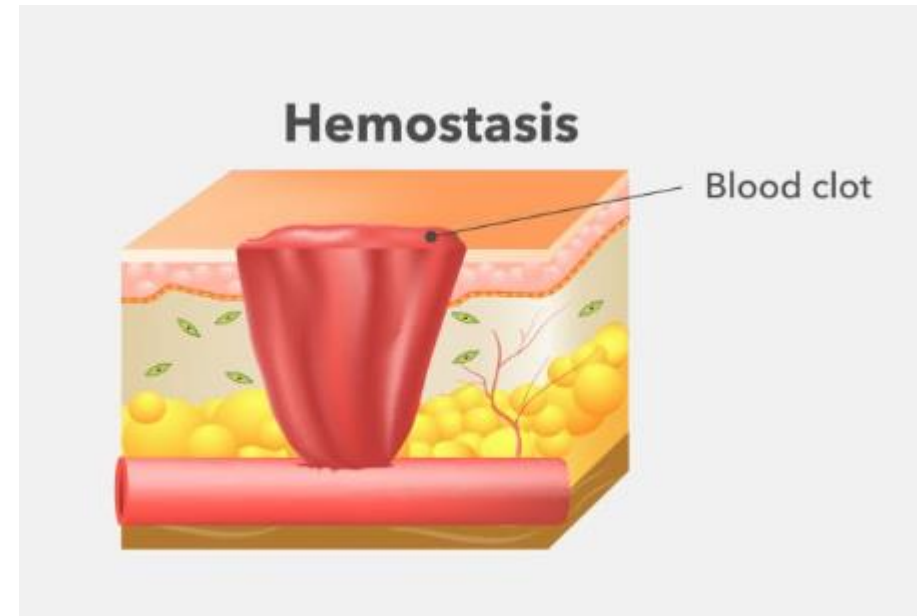
- stops bleeding after vascular damage.

It occurs in three steps:

1. vasoconstriction
2. primary hemostasis
3. secondary hemostasis

The critical cell involved in this process is the platelet

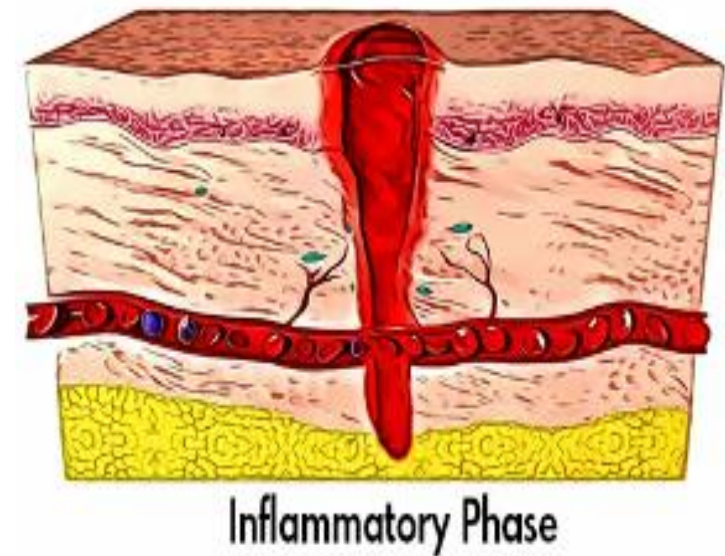
The critical matrix component is fibrinogen.



Phases of healing – 2nd phase

Inflammation - occurs at 0 - 4 days

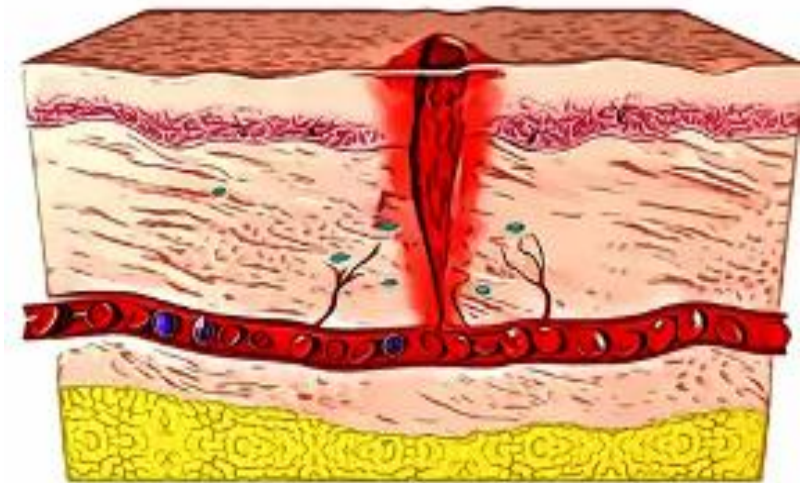
- Histamine and vasoactive chemicals are released to facilitate haemostasis
- Influx of leukocytes, erythrocytes and plasma proteins
- Increased blood causes classic signs of inflammation
- Erythema
- Swelling
- Heat
- Pain



Phases of healing – 3rd phase

Proliferation/Reconstruction occurs at 2-24 days

- Macrophages bind to extracellular matrix (ECM)
- Growth factors are released
- Angiogenesis (new blood vessels form)
- Granulation tissue forms
- Wound contraction
- Epithelialisation

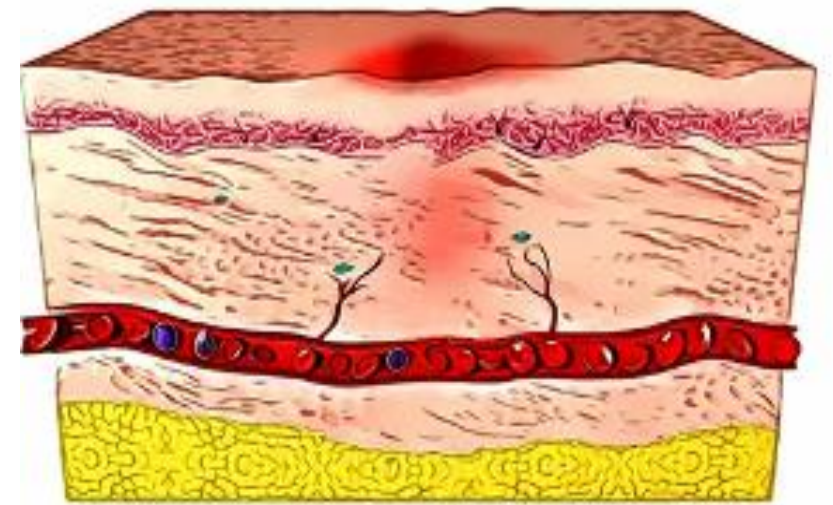


Proliferative Phase

Phases of healing – 4th phase

Remodelling/maturation occurs at 24 days - >1 year

- Immature scar forms
- Only ever get 80% tensile strength
- Not as pliable as uninjured skin
- At risk of breakdown



Maturation Phase

Wound care education

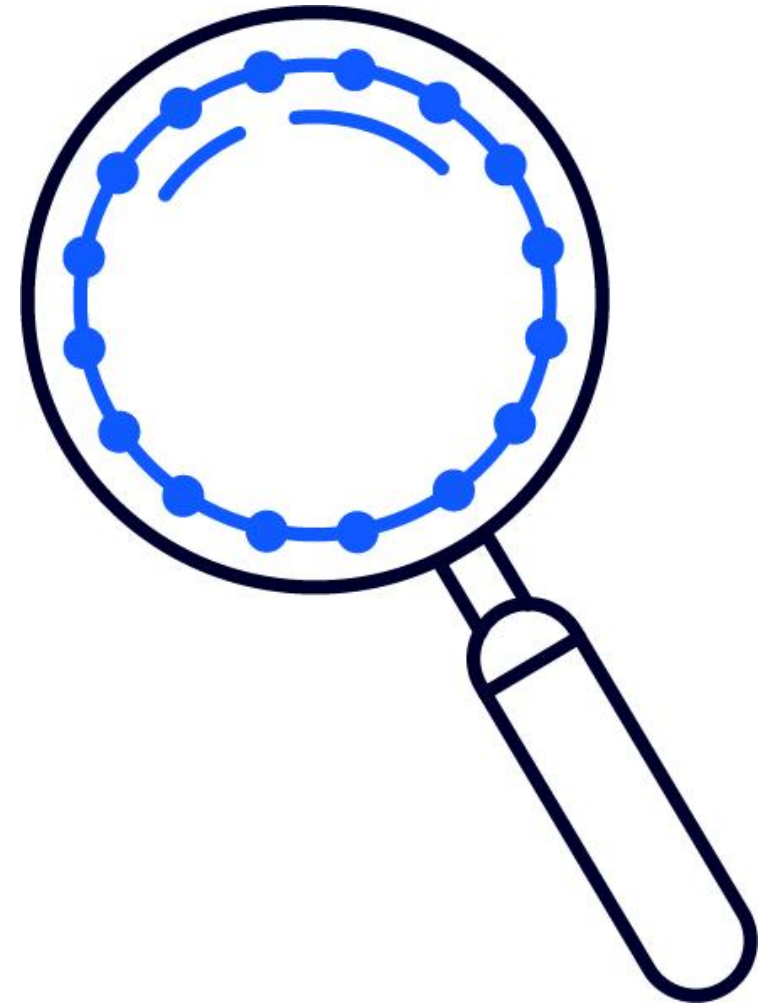
Wound healing

- The wound healing can be disrupted at any time during the 3 phases of healing.
- It takes time and knowledge to understand how, why and when the disruption occurs.
- These causes can mostly be identified, by taking time to discuss the history of the wound and history of the patient.

Patient history

Be a detective

Identify any
associated factors
that may influence
the healing process



Patient assessment

What we need to know about the patient

- Allergies and skin sensitivities
- Smoking
- Nutrition levels, haemoglobin, protein, albumin, Vit A, C, D, zinc
- Medical history
- Age
- Obesity - >20% over desired weight range
- Terminal illness
- Neuropathy
- Ischaemia
- Blood glucose in patients with diabetes
- Previous examinations
- Previous treatments
- Any specialists or multi-disciplinary teams involved
- Medications

Wound assessment

What we need to know about the wound

- When it occurred
- How
- Location
- Type (surgical/non-surgical, acute/chronic/acute on chronic)
- Size
- Exudate – amount, type
- Odour
- Appearance
- Surrounding skin
- Recent changes
- Pain/discomfort
- Stage of healing
- Clinical signs of infection

Chronic wounds

Local factors that affect wound healing

- Oedema
- Infection
- Foreign bodies
- Repeated trauma
- Non-viable tissue
- Ischaemia
- Wound dehiscence
- Presence of biofilm (inadequate wound hygiene)

Chronic wounds

Systemic factors that affect wound healing

Emotional stress can also negatively affect the healing of a wound, possibly by raising blood pressure and levels of cortisol, which lowers immunity



Wound assessment

TIME principle

T - Tissue - clinical appearance, na



*Images by Medetec Wound Database

Wound assessment

TIME principle

I - Inflammation/infection - is there redness, pain, high output of exudate, serous, haemoserous, purulent, haemopurulent, green, amount of odour once cleaned?



*Images by deposit photos

Wound assessment

Signs of infection

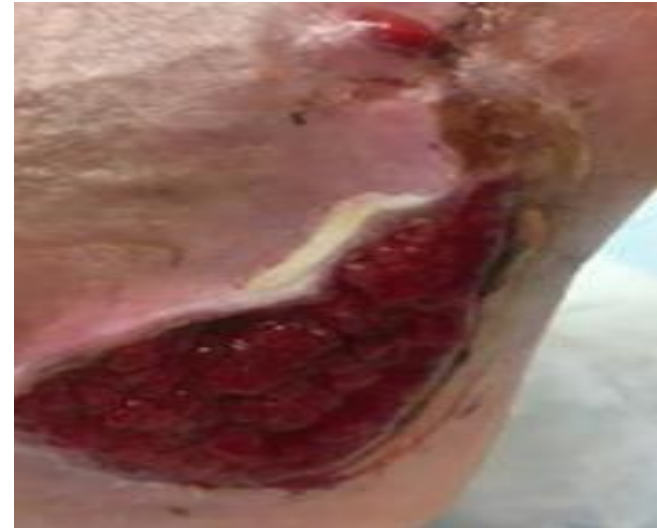
- Localised erythema
- Pain/tenderness that's unexpected
- Heat
- Oedema
- Cellulitis
- Exudate, viscous, discoloured, purulent
- Friable/bleeding tissue
- Wound breakdown
- Hypergranulation tissue
- Odour
- Delayed healing
- Islands of tissue in the centre of the wound
- Be aware of osteomyelitis if wound over a bone

Wound assessment

TIME principle

M - Moisture – A moist wound environment is needed to enhance the autolytic debridement of the wound and acts as a transport medium for essential growth factors during epithelisation.

Too dry



*Images by Medetec Wound Database

Wound assessment

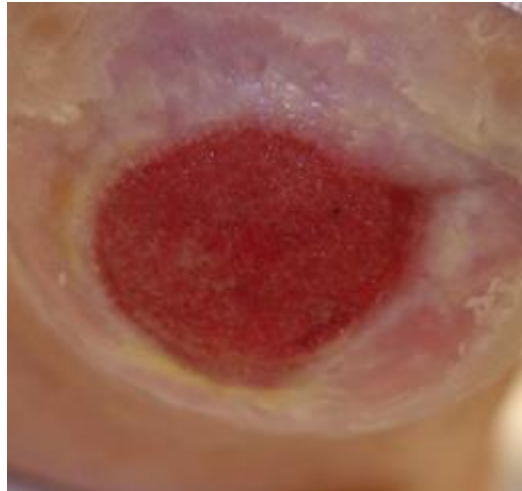
Functions of exudate:

- Serous fluid supplies essential nutrients, proteins, glucose
- Transport medium for white cells
- Prevents tissue dehydration
- Accelerates angiogenesis
- Autolysis of dead tissue and fibrin
- Growth factors
- Cleanses the wound
- Reduces wound pain by keeping the nerve endings moist.

Wound assessment

TIME principle

E – Edges of the wound – migration of epithelial tissue coming from the edges, no advancement, undermining, dehiscence, inflammation, maceration. Wounds heal from the wound edges.



*Images by Medetec Wound Database

Wound assessment

Assessing the peri wound area

- Intact
- Fragile
- Skin temperature – is it cooler/warmer/hotter in comparison to opposite anatomical site?
- Sensory loss
- Oedema/induration/dry or moist to touch
- Maceration/excoriation
- Hyperkeratosis
- Too dry
- Clean/dirty.

Wound assessment

Types of pain

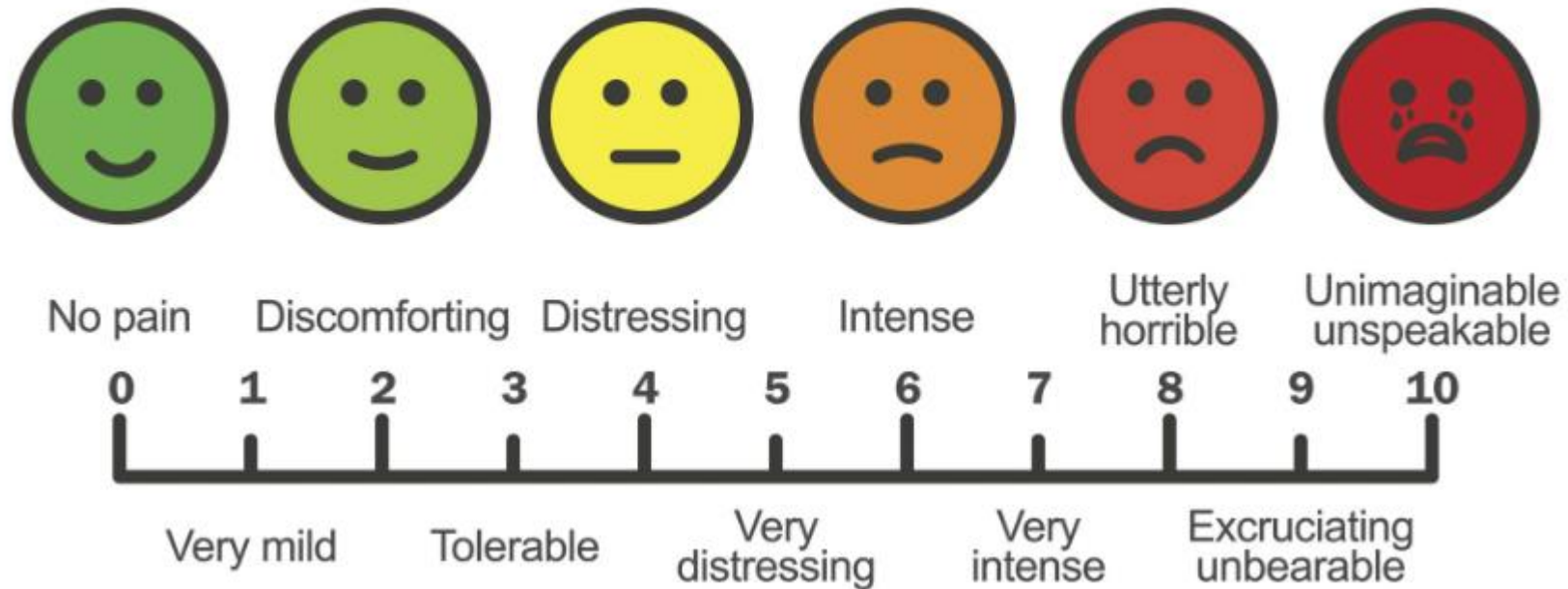
- **Nociceptive** - located in the tissue area feels like throbbing/stabbing pain associated in the wound area.
- **Neuropathic** - nerve pain, burning, tingling, shooting pain.
- **Ischaemic** – decreased blood flow causes excruciating pain in the wound area and beyond.
- Low tissue perfusion in lower limbs that are elevated increases the pain due to negative gravitational force so usually pain is worse at night.
- Is relieved if feet hung outside the bed or if patient gets up and walks.

European Wound Management Association, 2002; Mudge and Orstad, 2010

Wound care education

Pain

Visual Pain Scale



Pain

Pain assessment tools

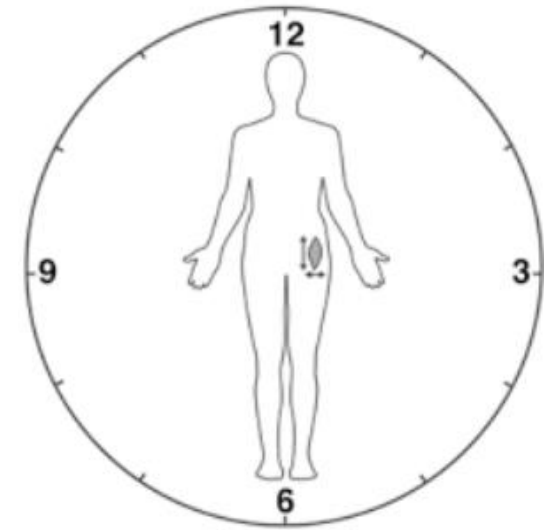
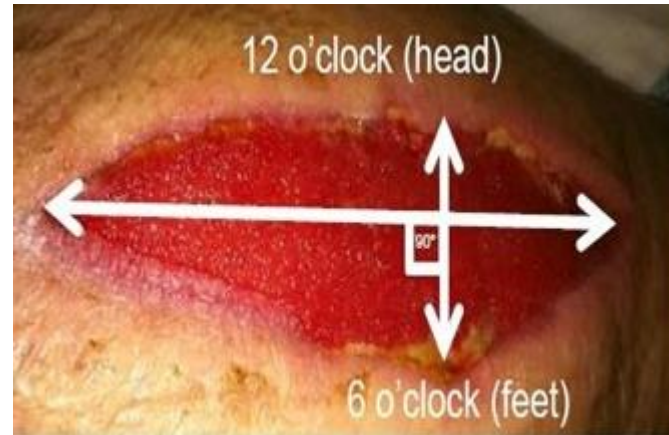
- Dementia Pain Scale – Pain assessment in Advanced Dementia (PAINAD) Scale
- Elderly - Abbey Pain Scale
- Behavioural Pain Assessment in the Elderly - Doloplus-2
- Cognitive Impairment - Bolton Pain Assessment Tool
- Paediatric Pain Scale – Face, Legs, Activity, Cry, Consolability (FLACC) Scale
- Wong-Baker FACES Pain Rating Scale (FRS).

Wound assessment

Measurements

A baseline of:

- Length -12-6 o'clock
- Width - 9-3 o'clock
- Depth (sterile wound probe)
- Undermining/tunnelling/sinus/fistula/cavity

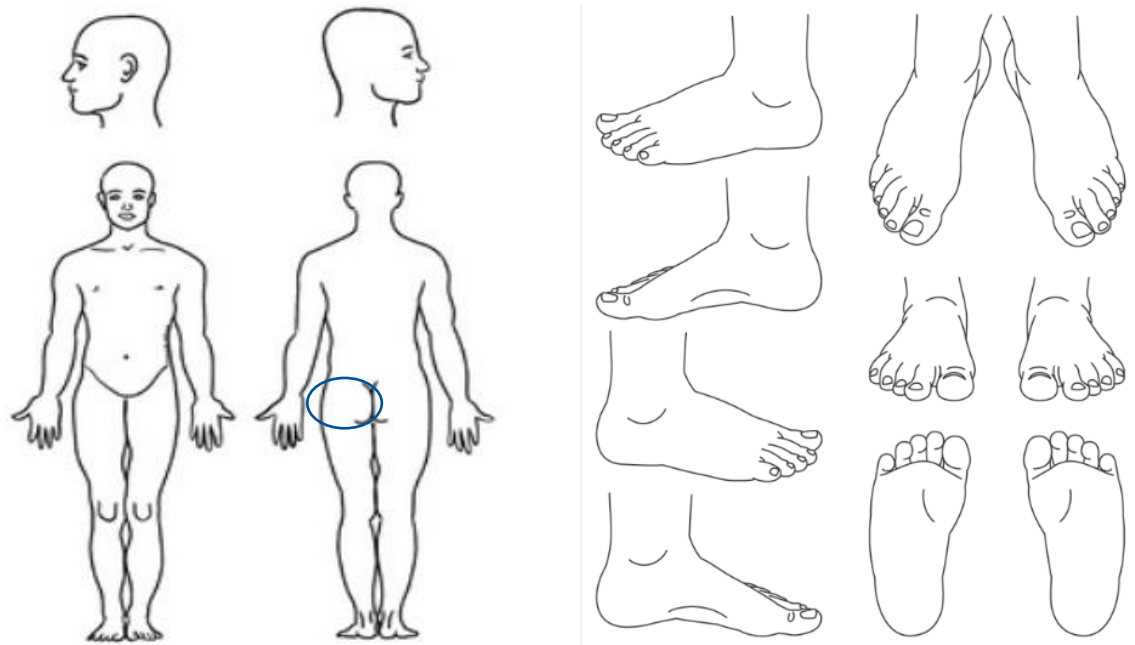


Wound assessment

Wound location

Use correct & consistent terminology

e.g. Left ischial tuberosity



Wound assessment

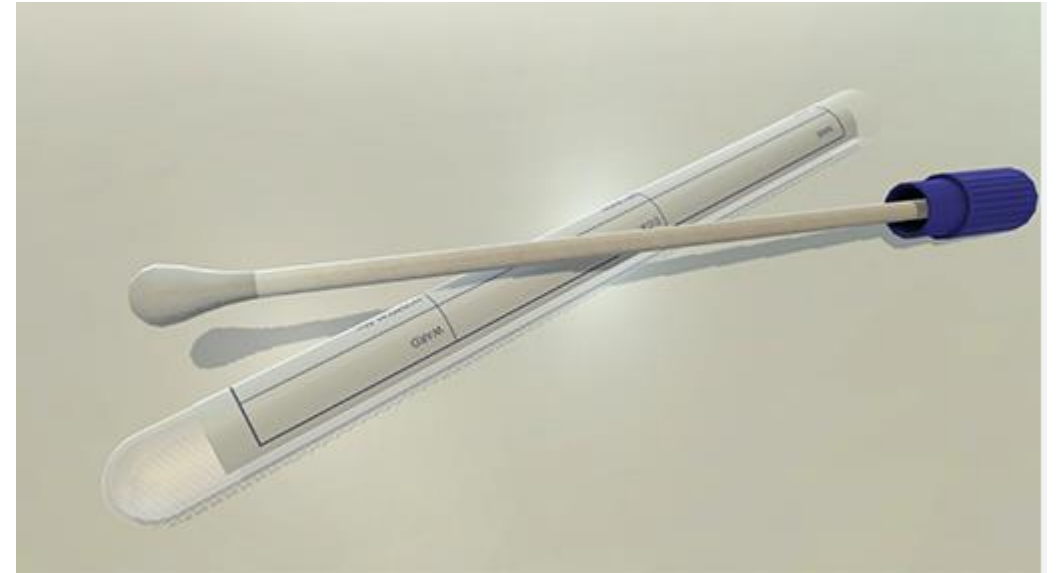
Wound photography

- Doesn't replace wound measurements.
- Another tool in the kit – linear
- Follow your own policies and procedures
- Use measurement rulers
- Best practice is taking at least 3 photos
- 20cm away from the wound
- 30cm away from the wound
- Photo of the anatomical area, e.g. left lower leg
- Cover anything that identifies the patient e.g. tattoos, eyes, birthmarks

Wound assessment

Wound swabs

1. Clean the wound thoroughly with normal saline or sterile water
2. Debride any loose tissue
3. Rinse again



Wound assessment

Wound swabs

Levine method:

- Rotate the swab over a 1cm square area with enough pressure to express fluid from the wound tissue.



Defining the wound type

Acute wound

- Occurs suddenly and progresses through the stages of healing as expected.
- Usually caused by trauma or surgery.
- Heals or progresses to healing by 30% within 4 weeks by primary or secondary intention.

Types of acute wounds

- Haematoma
- Cut/scratch/abrasion
- Burns
- MASI - Medical Acquired Skin Injury (usually from tapes)
- Surgical site infections
- Skin tears
- Blisters

Wound care assessment

Surgical site infections

- Occurs within 30 days of surgery
- Involves skin and subcutaneous tissue at the incision site
- Clean dry wounds are usually covered with vapour-permeable film dressing
- Allows visualisation of the incision site for complications
- Haematoma or seroma should be aspirated or incised for drainage to prevent secondary infection.
- If associated with superficial wound dehiscence, treat with absorbent dressings such foam or hydrofibre.

Wound care assessment

Surgical site infections

- Fluid should be sent for culture and sensitivity. Antibiotics commenced in the presence of systemic features of an infection.
- In the event of complete wound dehiscence, the wound must be covered with bulky sterile dressings.
- Check temperature of the patient.
- Contact the surgeon.
- May need surgery.



*Image by Healthgrades

Wound care education

Assessing skin tears

- Assess if the torn skin is salvageable
- Clean the wound bed with normal saline
- Moisturise the skin gently with normal saline soaked gauze
- Replace the skin over the exposed wound area using sterile forceps or sterile gloves
- Apply a silicone dressing
- Draw an arrow on the outside of the dressing in the preferred direction of removal
- **Steri strips not recommended**
- Keep skin moisturised to maximise elasticity (use of emollients) to prevent skin tears.

Wound care education

Skin tears

ISTAP - International Skin Tear Advisory Panel

*A flap in skin tears is defined as a portion of skin (epidermis/dermis) that is unintentionally separated from its original place due to shear, friction and/or blunt force



Skin Tear Classification

Type 1: No Skin Loss



Linear or Flap* Tear which can be repositioned to cover the wound bed

Type 2: Partial Flap Loss



Partial Flap Loss which cannot be repositioned to cover the wound bed

Type 3: Total Flap Loss



Total Flap Loss exposing entire wound bed

Wound care assessment

Blisters

- Fluid filled separation of the epidermis from the dermis
- Assess extent of blistering and anatomical position
- Should be left intact if not taut or causing further pressure on the tissue.
- Check the colour of the fluid, clear or opaque.
- May be infection present.
- Blisters over joints generally need to be de roofed



Defining the wound type

Chronic wounds

Wounds that have failed to proceed through an orderly and timely process as anticipated to close the skin

(Keryln Carville; Wound Care Manual, 8th edition pg. 61)

Tend to be a symptom of an underlying chronic disease state such as diabetes, PVD, venous disease, immobility, chronic kidney disease, immunocompromised state, nutritional deficits and infection.

Types of chronic wounds

- Diabetic foot ulcers
- Pressure injuries
- Malignant
- Venous leg ulcers
- Arterial ulcers

Wound care education

Pressure injuries

Pressure injuries usually occur over a bony prominence – pressure and shearing forces. Can be caused by a medical device or other objects, e.g. shoes

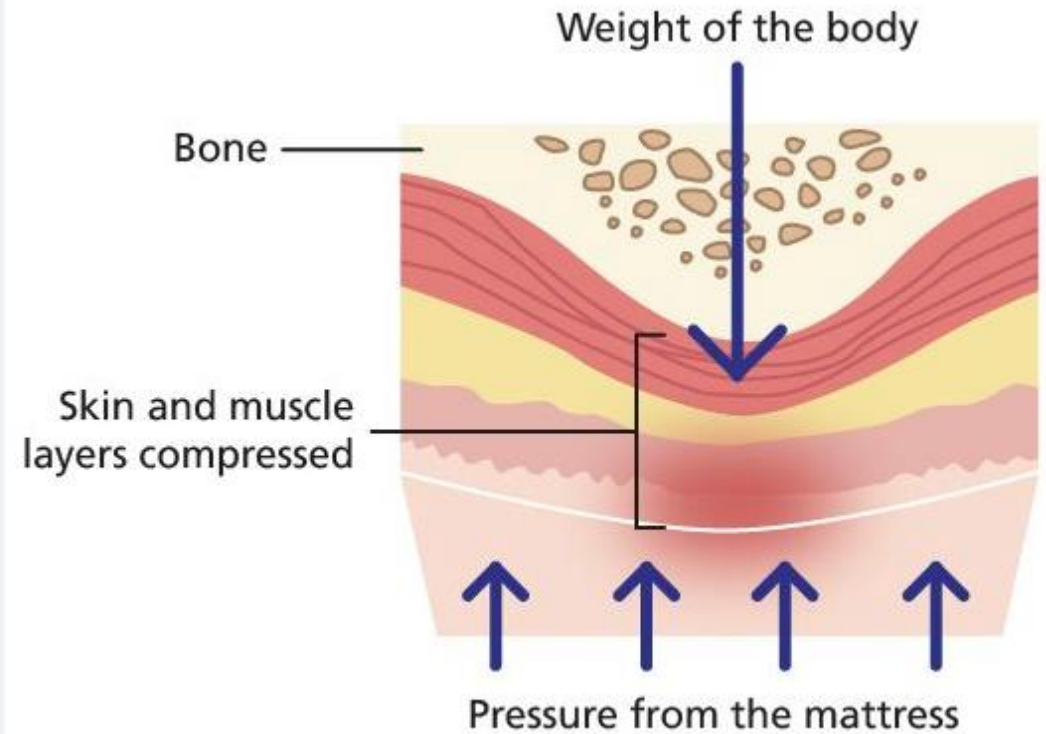
Staging

- **Stage 1:** erythema of the skin/reddened area does not blanch
- **Stage 2:** erythema with the loss of partial thickness of the skin including epidermis and part of the superficial dermis.
- **Stage 3:** full thickness ulcer that might involve the subcutaneous fat.
- **Stage 4:** full thickness ulcer with the involvement of the muscle or bone.
- **Unstageable:** Unable to see the wound base
- **Suspected deep tissue injury:** Intact black or purple area, may feel boggy or hard

How pressure on the skin occurs

Pressure injury is representative of tissue experiencing inflammation occurring from cell death within muscle tissue

Tissue damage is only visible when significant underlying deterioration has already

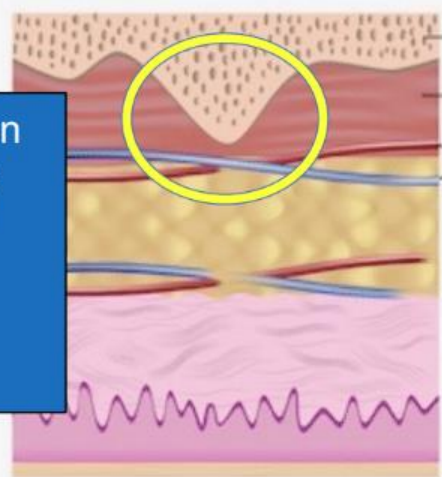


Etiology of Pressure Sores / Ulcers / Injury

Sites vulnerable to body weight induced tissue deformation



Pressure of bone against hard surface



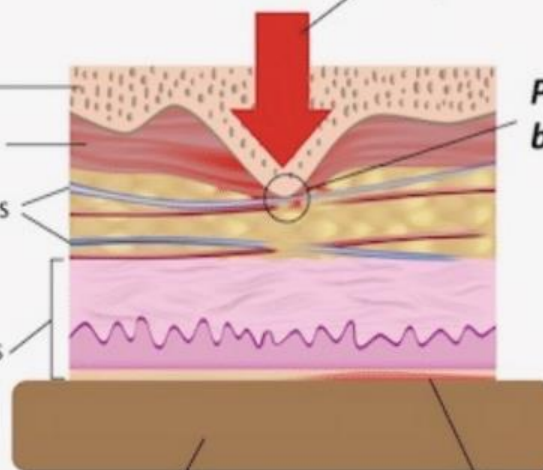
Cell deformation theory (Gefen):

- Deformation
- Capillary occlusion
- Lymphatic disruption

Normal

Bone
Soft tissue
Blood vessels

Skin layers



Pinching off of blood vessels

Angiosome theory (Fife):

- Pinching / kinking
- Hypoperfusion
- Body position

Hard surface (bed)

Friction of skin against the surface

Friction & shear add to cell distortion

just now

Assessing and managing pressure injuries

Stage 1

- Intact skin
- Redness non-blanchable
- Usually over a bony prominence
- Can be painful, firm or soft, warmer or cooler than the surrounding skin
- May be difficult to detect in dark skin tones
- Apply protective dressing usually silicone or heel foam
- Off load the pressure

*Image Australian Wound Management Association



Assessing and managing pressure injuries

Stage 2

- Partial thickness loss of epidermis and dermis.
- Presents as a shallow open wound with pink/red tissue no slough present.
- Can be an intact or open ruptured fluid filled blister.
- Can be dry or moist wound bed.
- Silicone dressings, PICO
- Off load, prevent shearing
- OT referral/podiatry



Assessing and managing pressure injuries

Stage 3

- Full thickness tissue loss
- Slough may be present, does not hide the depth of the tissue loss
- Subcutaneous fat may be seen on view
- Tunnelling and undermining might be present
- Varies by anatomical location



Assessing and managing pressure injuries

Stage 3

- Bridge of the nose, pinna, occiput, malleolus don't have subcutaneous tissue so Stage 3 PI's can be shallow in these areas.
- Hydrofibre packing, waterproof foam dressing, PICO.
- Offloading, referral to an OT, dietician and surgical review.

- *Image by North of England Critical Care Network



Assessing and managing pressure injuries

Stage 4

- Full thickness tissue loss.
- Exposed bone, tendons, or muscle.
- Slough or eschar may be present in the wound bed.
- Negative Pressure Wound Therapy.
- Offloading, referral to an OT, dietician and surgical review (likely will need flap repair to heal).
- Specialist nursing in a hospital.



* Image Wikipedia

Assessing and managing pressure injuries

Unstageable

- Full thickness tissue loss with slough, and/or eschar covers the base of the wound.
- Depth not known until the dead tissue is removed.
- If the pressure injury is on a heel and is stable without erythema or fluctuance (boggy) leave intact as the body's natural defence system.



Assessing and managing pressure injuries

Unstageable

- Vascular review, may need debridement if safe to do so, otherwise Betadine paint and heel foam dressing easily removed to check progress
- OT referral for off loading and/or podiatry if on the foot.



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Assessing and managing pressure injuries

Suspected deep tissue injuries

- Presents as an intact area of purple or maroon discoloration or blood-filled blister.
- Damage of underlying soft tissue caused by pressure and/or shear.
- May be painful, boggy, warmer or cooler in the surrounding tissue.
- Can become hardened.
- May be difficult to detect in dark skin tones.
- Paint with Betadine, cover with silicone waterproof dressing.
- Refer to OT, if on the heel vascular review, maybe plastics team.



Multidisciplinary team

When to refer and who to refer to

- Not responding to treatment.
- Deterioration - know when to escalate and refer to specialty services.
- Leg ulcer not healed after 12 weeks.
- Wound biopsy.
- Sharp debridement (nurse or surgical) if not trained.
- Alternative dressing advice if current products unsuitable.
- Pressure injury – vascular, occupational therapist, plastics team.
- Diabetic foot wounds – vascular and podiatry, high risk foot clinic, infectious diseases team.
- Unusual wounds- dermatology, rheumatology
- Don't forget nutrition – check blood pathology.

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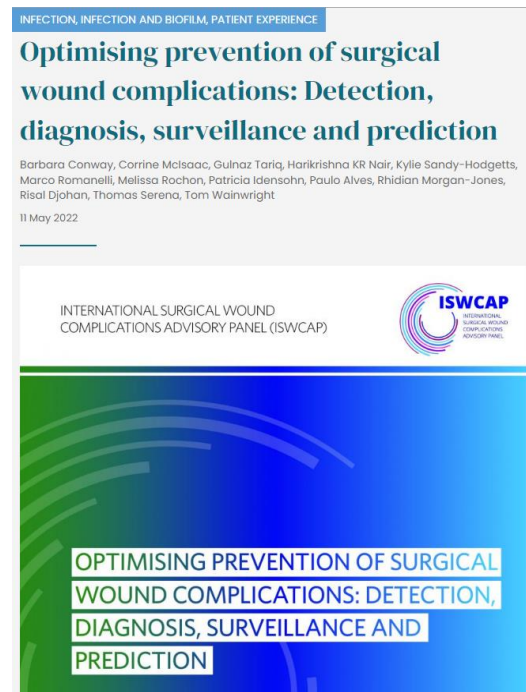
Points to remember

1. Document everything and be consistent
2. Consider what's normal for the patient- expectations of wound healing
3. Early intervention is key.
4. Consider when to escalate and refer to specialty services, the sooner the better
5. A multidisciplinary approach and teamwork is essential.
6. Work within your scope of practice/challenge your practice.

Wound care education

Consensus documents

<https://woundsinternational.com/consensus-documents/wound-infection-in-clinical-practice-principles-of-best-practice/>



Wound care education

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Any Questions?

We thank you for your time