
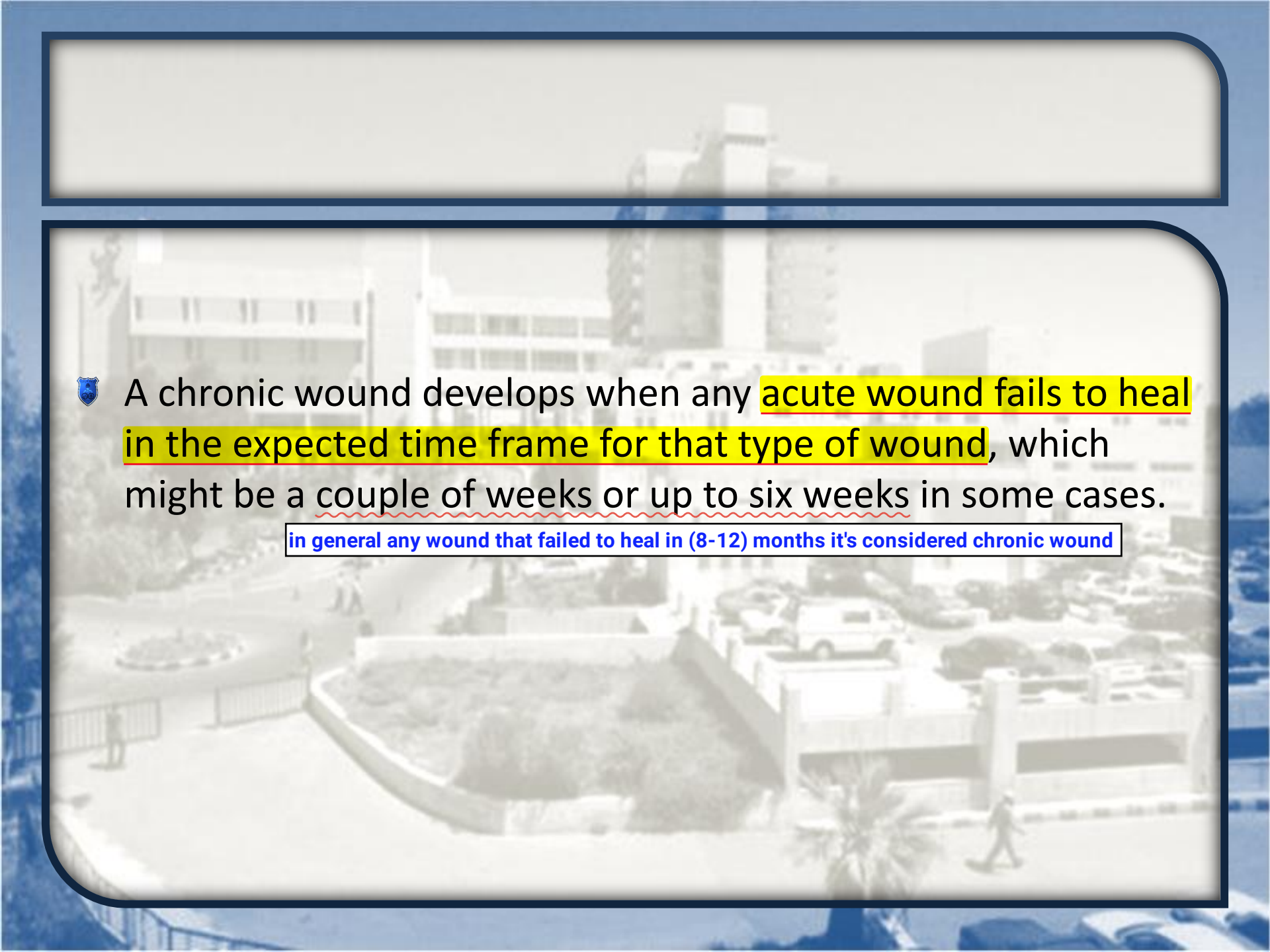


4.28 Clinical features of venous and arterial ulceration

Clinical feature	Venous ulceration <small>as DVT is more common in women</small>	Arterial ulceration <small>as Atherosclerosis is more common in males</small>	Neuropathic ulceration
Sex	More common in women	More common in men	Equal in men and women
Risk factors	Thrombophilia, family history, previous deep vein thrombosis, varicose veins	Known peripheral vascular disease or risk factors for atherosclerotic disease, e.g. <u>smoking</u> , <u>diabetes</u> , <u>dyslipidaemia</u> , hypertension	<u>Diabetes</u> or other peripheral neuropathy (loss of sensation, loss of intrinsic foot muscle function, autonomic dysregulation)
Pain	Often painless but some patients have some pain that improves with elevating the leg	Severe pain, except in diabetics with neuropathy; improves on dependency <small>offloading technique (?)</small>	Painless or neuropathic pain
Site	Gaiter areas; 80% medial (long saphenous vein), 20% lateral (short saphenous vein)	Pressure areas (malleoli, heel, fifth metatarsal base, metatarsal heads and toes) Distal areas	Pressure areas, sole of foot, tips of toes
Appearance	Shallow, irregular margin Slough on granulating base <small>Sloping edges</small>	Regular, 'punched out' Sloughy or necrotic base	Macerated, moist white skin surrounded by callus, often on load-bearing aspects (motor neuropathy) <small>hyperkeratosis</small>
Surrounding skin	Lipodermatosclerosis always present Oedema	Shiny, hairless, trophic changes	Dry due to reduced sweating (autonomic neuropathy)
Veins	Full and usually varicose	Empty with 'guttering' on elevation	Normal
Temperature	Warm Palpable pulses	Cold Absent pulses	Warm or cold due to autonomic neuropathy Palpable pulses

Chronic Wounds

 *Chronic wounds are defined as wounds that have failed to proceed through the orderly process that produces satisfactory anatomic and functional integrity or that have proceeded through the repair process without producing an adequate anatomic and functional result.*



♣ A chronic wound develops when any **acute wound fails to heal in the expected time frame for that type of wound**, which might be a couple of weeks or up to six weeks in some cases.

in general any wound that failed to heal in (8-12) months it's considered chronic wound

Most common types of chronic wounds

🛡️ The vast majority of chronic wounds can be classified into four categories:

- Ischaemic Arterial Ulcers. Ischemia is very painful
- Venous Stasis Ulcers.
- Diabetic wounds. >> Ischemic + Neuropathic (Trophic)
- Pressure ulcers.

🛡️ A small number of wounds that do not fall into these categories may be due to causes such as radiation poisoning, ischemia, or malignancy.

Scope of the problem

🛡️ Incidence 2.7% - 29.5%

🛡️ High risk patients:

- Quadriplegics
- Neurosurgery
- Orthopedic..post-op hips..up to 66%
- Critical care MICU/CCU/SICU...33% - 41%
- Prolonged anaesthesia time
- Debilitated and elderly(age > 70)



Ischemic ulcers

Ischemic arterial ulcers **occur due to a lack of blood supply** and are **painful at presentation**.

arterial insufficiency

Location : occurs distally

Ischemia is very painful

They usually are **associated with other symptoms of peripheral vascular disease**, such as **intermittent claudication**, **rest pain**, **night pain**, and **colour changes**.

- ✓ Rest pain is worse the night pain
- ✓ Night pain pathophysiology : Absence of gravity effect that helps in supplying distal lower extremities with blood in the presence of narrowed vessels
- ✓ Night pain causes the patient to wake up multiple times during the night bcz of pain >> pain is relieved when the patient starts sleeping on a chair > this causes increasing the edema which lead to Rest pain

muscle pain that happens when you're active and stops when you rest. it occurs because O2 supply of the muscle fails to meet the increase in demand during exercise > causing shut down of aerobics respiration > anaerobic respiration starts and lactic acid accumulate inside the muscular cells

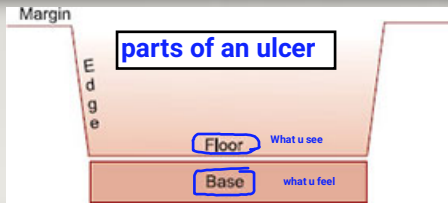
****Ankle-Brachial index (ABI):**

- ✓ ABI is a simple test that compares the blood pressure in the upper and lower limbs >> It gives an idea about PVD and circulation
- ✓ $ABI = \text{Higher SBP of the ankle} \div \text{Higher SBP of the brachial}$
- ✓ Ankle : we take the higher > either dorsalis pedis BP or posterior tibial BP
- ✓ Normal ABI : 0.9-1.3
- ✓ In cases of calcified in blood vessels as in patients with renal diseases or Diabetics , ABI will have values higher than 1.3 indicating "Non-compressible" vessels , in these patients ABI is not a useful measure

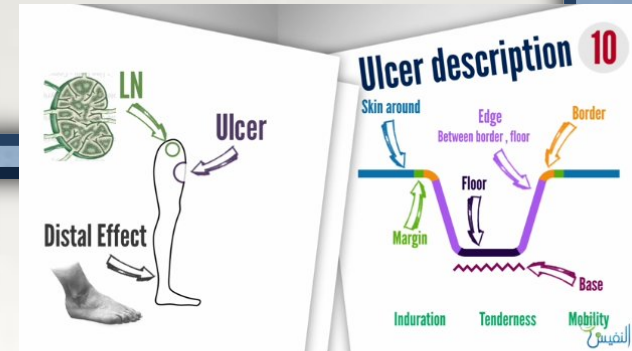
On examination, there may be **diminished or absent pulses** with **decreased ankle-brachial index** and **poor formation of granulation tissue**. Other **signs of peripheral ischemia**, such as dryness of skin, hair loss, scaling, and pallor can be present. thickened brittle nails

indicating
poor
healing

The wound itself usually is shallow with smooth margins, with pallor of base and surrounding skin might be present.



Examining an ulcer : Site , Size , Floor , Base , Edges , Margins (1-2 cm around the border of the ulcer) , border , surrounding , Distal effect , LN



Amputation stump ulcer of a previously amputated big toe



floor > granulation tissue
base > head of the 1st metatarsal

Gangrene is a gross descriptive term of the blackish tissue \ black color caused by iron sulfide



Gangrenous Necrosis :

- ✓ 2 types of gangrene dry gangrene (No infection) \Wet gangrene (there is infection)
- ✓ Management of "Dry Gangrene" is either by early amputation or spontaneous amputation
- ✓ Early amputation disadvantage : after the amputation an ulcer will develop > ulcers have high metabolism and already the area has abnormal blood supply > development of ischemia again.
- WHILE in spontaneous amputation tissues itself is a powerful stimuli for angiogenesis so by the time the gangrenous tissue falls and ulcers develop the area will be rich with new blood vessels.
- > spontaneous amputation disadvantage : 2° infections , sever pain
- ✓ Wet gangrene is a surgical emergency > Direct Amputation + Abx

Management of ischemic ulcers

♣ The management of these wounds is too-pronged and includes **revascularization and wound care.**

- It depends on the severity of the underlying arterial insufficiency.

Revascularization before debridement if possible >> better healing of an ischemic ulcer

♣ The **affected region can sometimes be revascularized via vascular bypass or angioplasty.**

if multi-level disease >> bypass isn't useful

♣ If infection is present, appropriate antibiotics are prescribed.

When proper blood flow is established, debridement is performed.

offloading technique :

If the wound is plantar (on walking surface of foot), patient is advised to give rest to foot to avoid enlargement of the ulcer.

Proper glycemc control in diabetics is important.

Smoking should be avoided to aid wound healing.

Smoking causes vasoconstriction

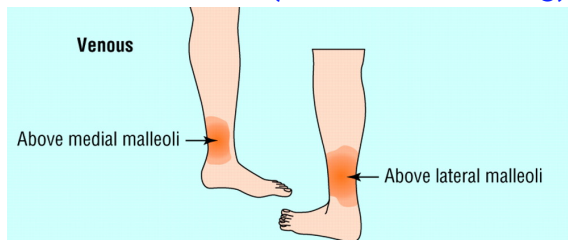
2 Venous stasis ulcer

🛡️ The clinically characteristic picture is that of an ulcer that fails to re-epithelialise despite the presence of adequate granulation tissue. >> all signs of a healing ulcer are present , yet it's a chronic ulcer

🛡️ Venous stasis occurs due to the incompetence of either the superficial or deep venous systems.

- **Chronic venous ulcers usually are due to the incompetence of the deep venous system and are commonly painless.**

Location : Gaiter area (lower 1\3 of the leg)



♣ Stasis ulcers tend to occur at the sites of incompetent perforators, ***the most common being above the medial malleolus, over Cockett's perforator.***

♣ The wound usually is shallow, with irregular margins and **pigmented surrounding skin.**

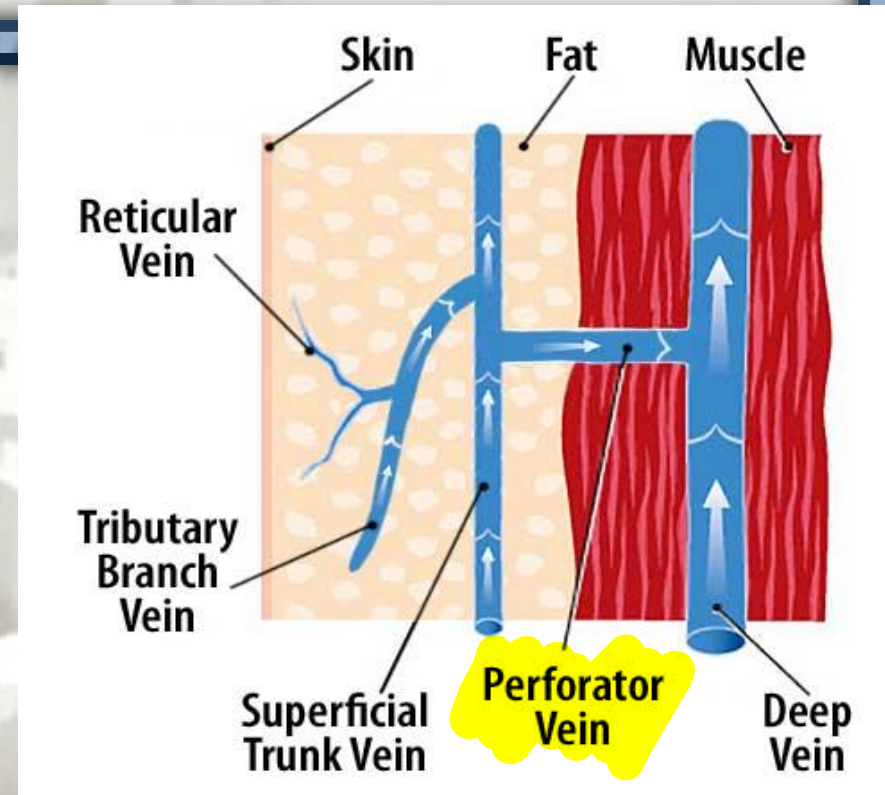
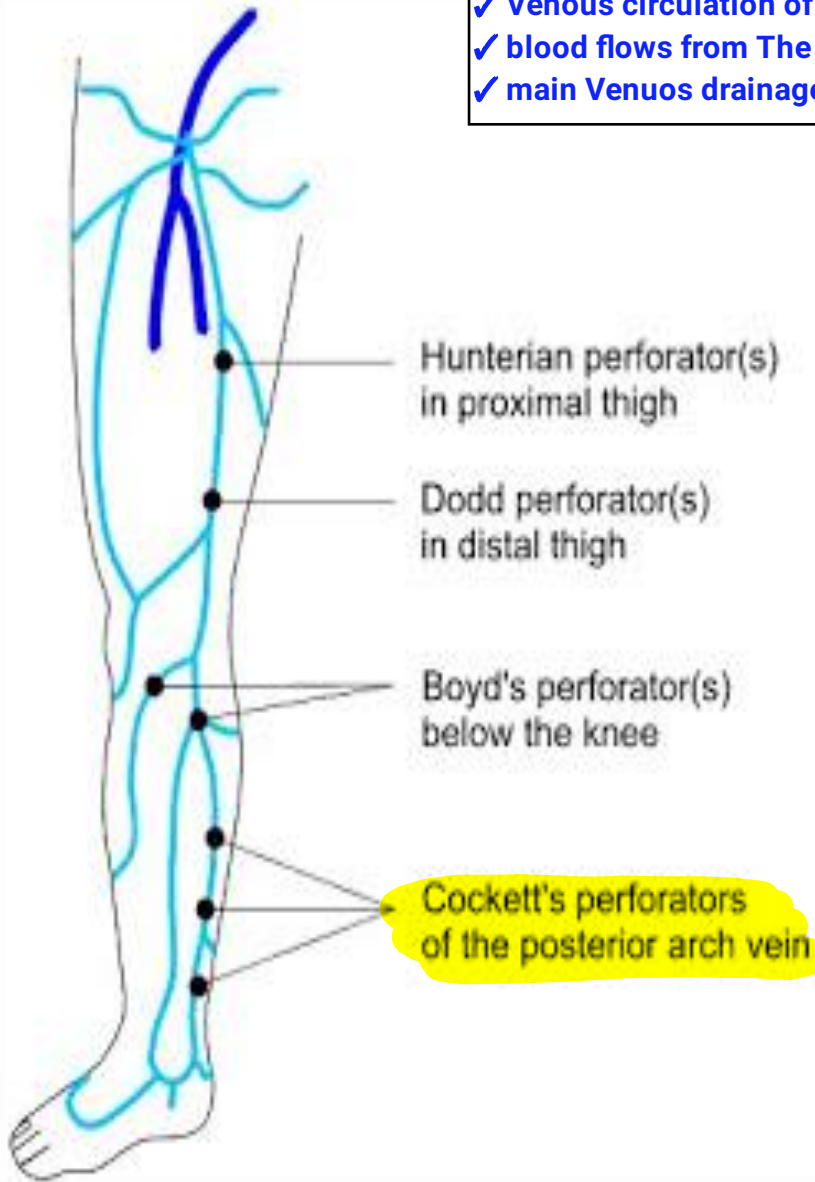


Pigmentation is caused by hemosiderin pigment that results from breaking down of RBCs

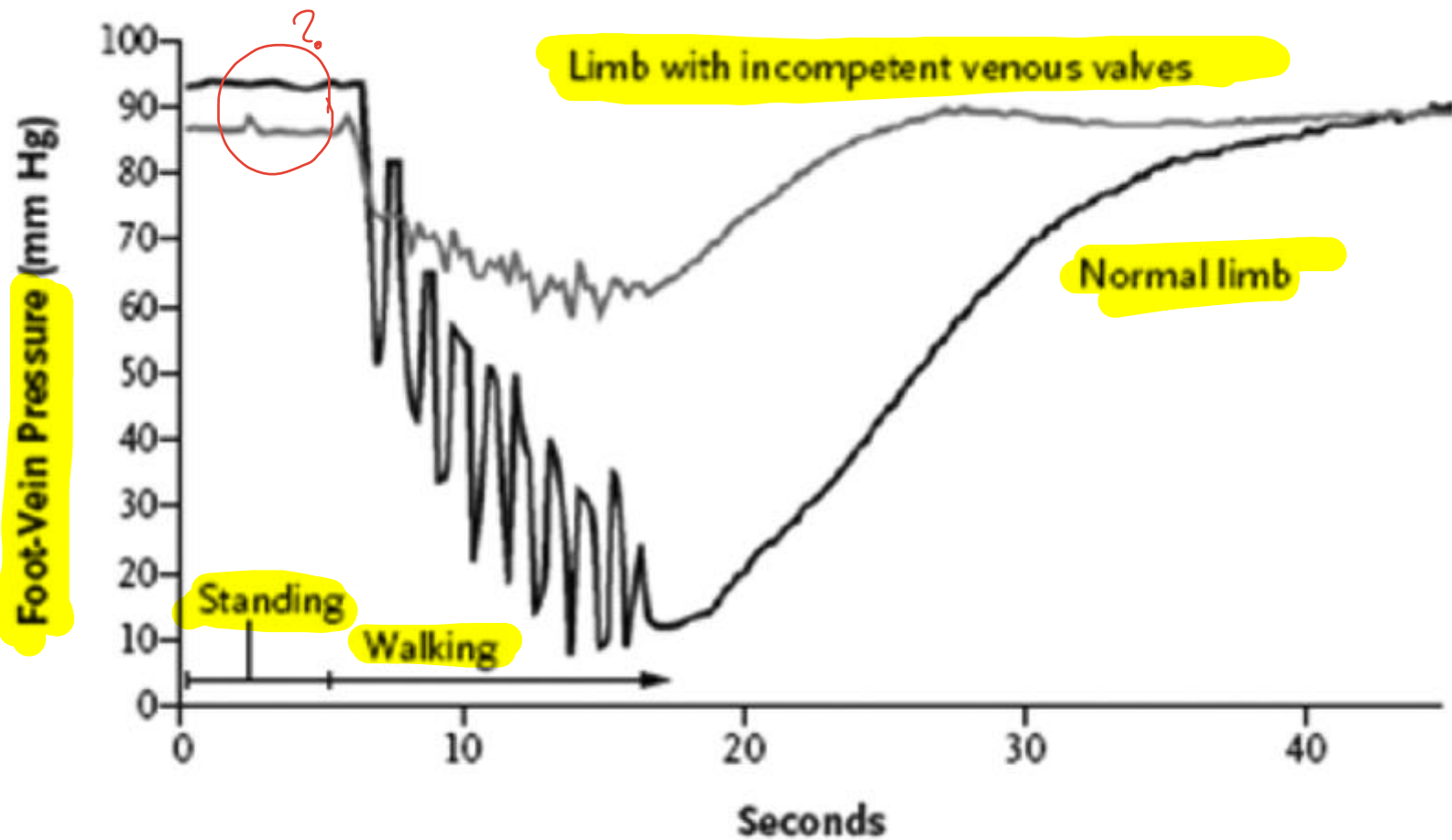
Long term Stasis > flow back from deep circ. to superficial veins and even RBCs escape > RBCs break down > hemosiderin released > engulfed by macrophages > hemosiderin laden macrophages stays **مدى الحياة**



- ✓ Venous circulation of the lower limbs composed of superficial veins and deep veins
- ✓ blood flows from The superficial veins towards the deep veins through perforators
- ✓ main Venous drainage of the lower limbs occurs through the deep veins



Venous insufficiency (incompetent valves) > Venous blood stasis > increase ankle venous pressure during walking



(Reproduced from Coleridge Smith¹⁷ with the permission of the publisher)

Lipodermatosclerosis



Chronic inflammation > chronic fibrosis > inverted champagne sign

Management

♣ The cornerstone of treatment of venous ulcers is **compression therapy**. muscles of the calf and the valves < (peripheral heart) **بتحل محل ال**

- It can decrease blood vessel diameter and pressure, which increases their effectiveness, preventing blood from flowing backwards.

♣ Compression is also used to decrease release of inflammatory cytokines, lower the amount of fluid leaking from capillaries and therefore prevent swelling, and prevent clotting by decreasing activation of thrombin and increasing that of plasmin.

Most venous ulcers can be healed with **perseverance** and by **addressing the venous hypertension**.

Recurrences are frequent. Therefore, **compression stockings** **are advised** to prevent the formation of new ulcers in people with a history of the same.



3

Diabetic Foot ulcer


Neuropathy + ischemic \\ but the main factor is neuropathic

One of the major complications of **uncontrolled *Diabetes Mellitus***,

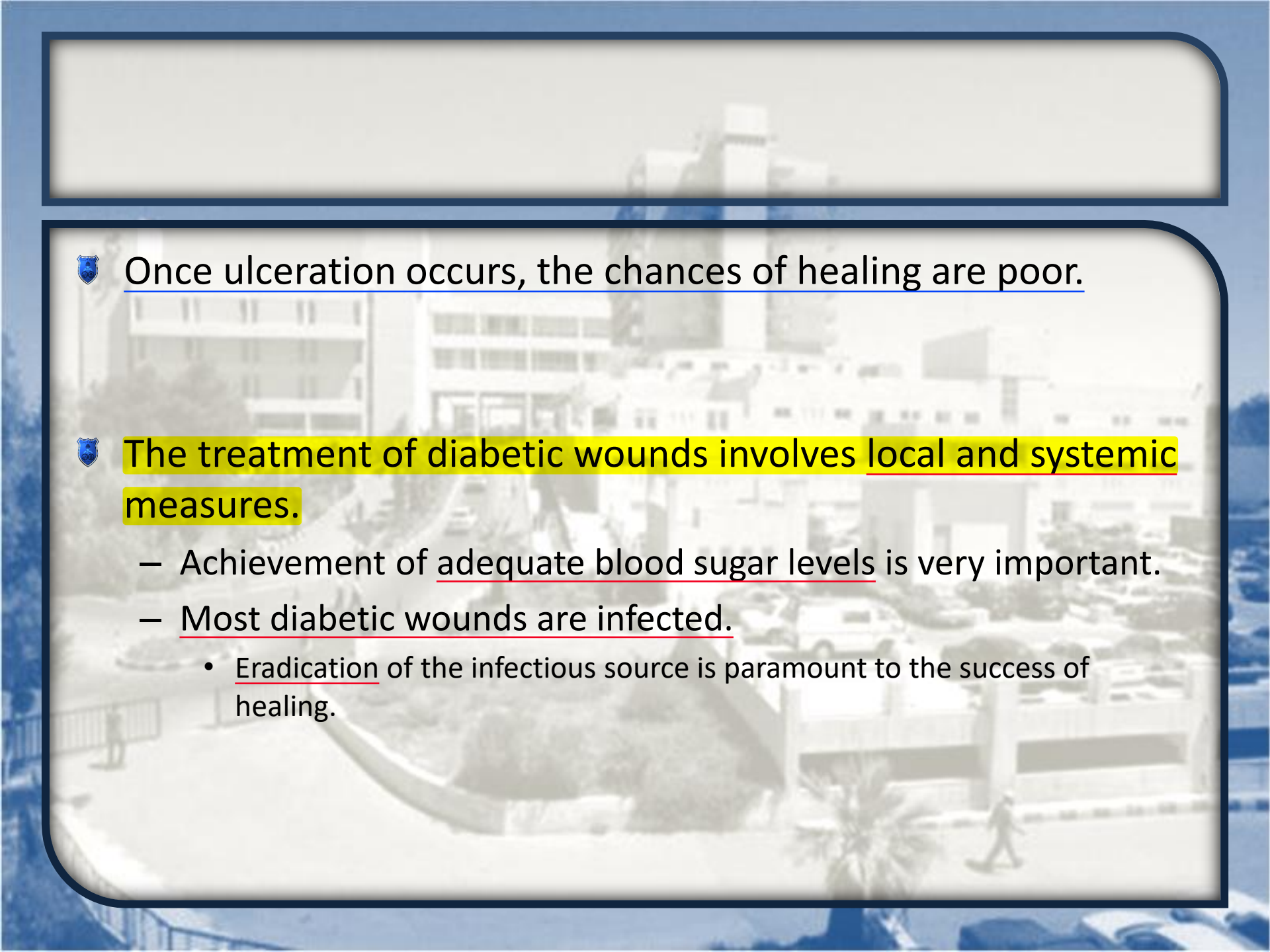
– Diabetic Foot Ulcers are a result of impedance of Wound Healing process due to a prolonged inflammatory phase. } any chronic wound

Diabetes causes neuropathy, which inhibits nociception and the perception of pain. Thus patients may not initially notice small wounds to legs and feet, and may therefore fail to prevent infection or repeated injury.

both cellular and humoral immunity are affected \\ but more with cellular \\ and more with neutrophils

 Further, diabetes causes **immune compromise** and **damage to small blood vessels**, preventing adequate oxygenation of tissue, which can cause chronic wounds.

 Pressure also plays a role in the formation of diabetic ulcers.



Once ulceration occurs, the chances of healing are poor.

The treatment of diabetic wounds involves local and systemic measures.

- Achievement of adequate blood sugar levels is very important.
- Most diabetic wounds are infected.
 - Eradication of the infectious source is paramount to the success of healing.

Foot ulcers in diabetes require multidisciplinary assessment, usually by podiatrists, diabetes specialists and surgeons.

Treatment consists of appropriate bandages, antibiotics, debridement, arterial revascularisation and platelet-rich fibrin therapies.

a fibrin membrane that can stimulate the release of many important growth factors involved during wound healing processes

painless \ over weight bearing areas \ floor rich in granulation tissue \ hyperkeratosis of the surrounding skin (mechanism of protection)





Wheelchair bound patients \\ bedridden patients

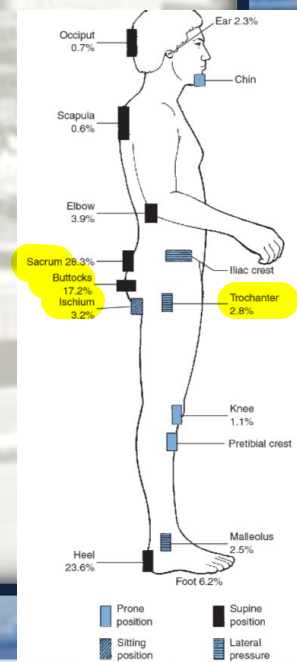
Decubitus / Pressure Ulcer

= Bedsores

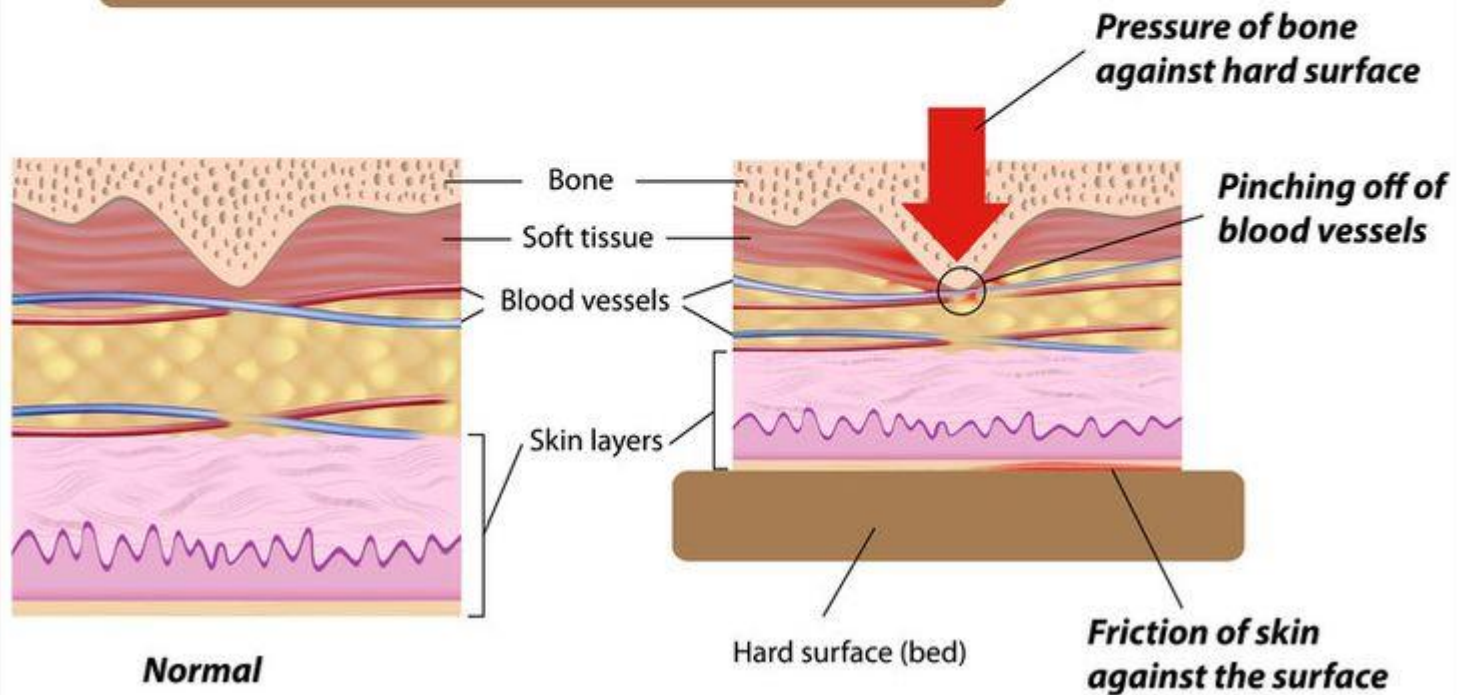
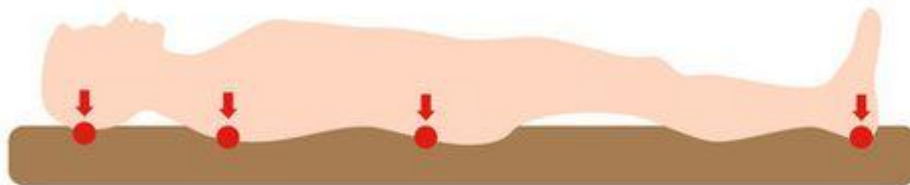
- ♣ A **pressure** ulcer is a localized area of tissue necrosis that develops when a **soft tissue** is compressed between a **bony prominence** and an external surface. **mattress**
causing pressure higher than that of capillary closing pressure (32mmHg)
- ♣ Pressure ulcer formation is accelerated in the presence of **friction, shear forces, and moisture.** **urine and fecal incontinence**
→ kinking vessels supplying the skin
- ♣ Other contributory factors in the pathogenesis of pressure ulcers *include* **immobility, altered activity levels, altered mental status, chronic conditions, and altered nutritional status.**



The most common sites are the skin overlying the sacrum, coccyx, heels or the hips, but other sites such as the elbows, knees, ankles or the back of the cranium can be affected



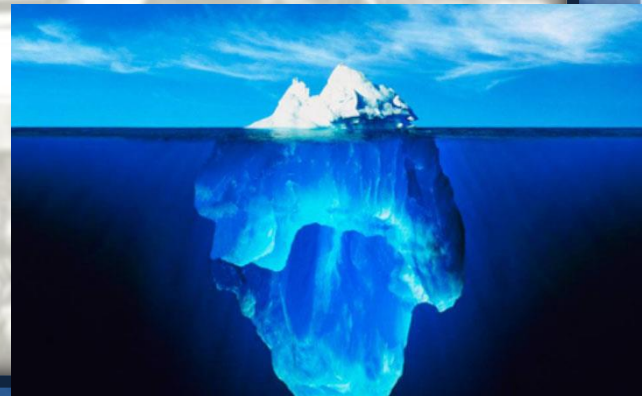
Anatomy of A Pressure Sore




each tissue has certain metabolic demand > that's why each tissue can withstand ischemia to certain time after it the injury become irreversible

ICEBERG principle

- Pressure is distributed in a roughly **upright cone**, expanding outward and down through the subdermal tissues:
- Eschar indicates Stage 3 or higher
- Subcutaneous wound is larger than the visible area of eschar**



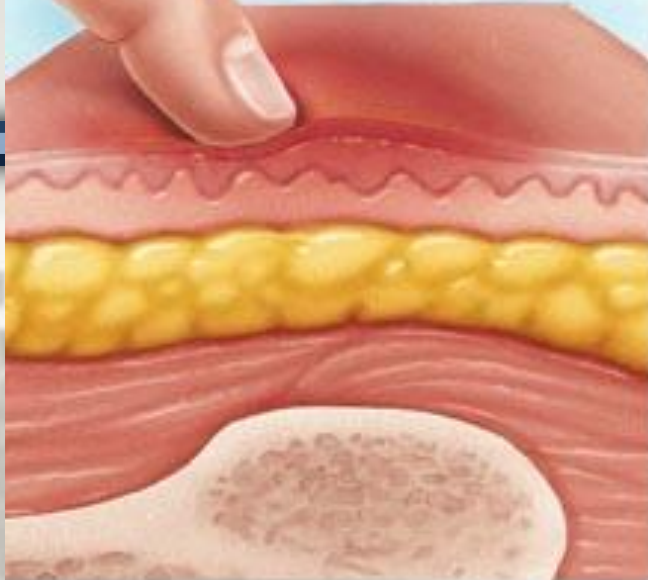


Pressure ulcers are divided into the following stages depending on severity:

- **Stage I:** Intact skin with non-blanchable redness of a localized area usually over a bony prominence.
- **Stage II:** Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough.
- **Stage III:** Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed.
- **Stage IV:** Full thickness tissue loss with exposed bone, tendon or muscle.

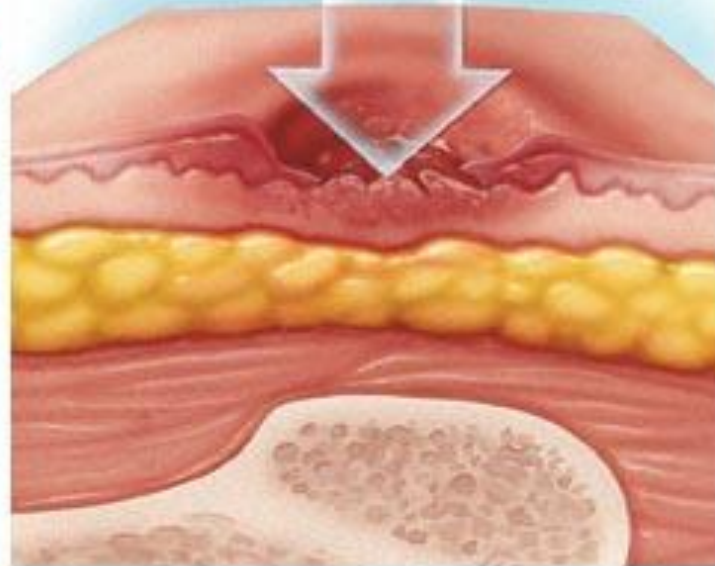
Stage 1

Skin is unbroken
but inflamed



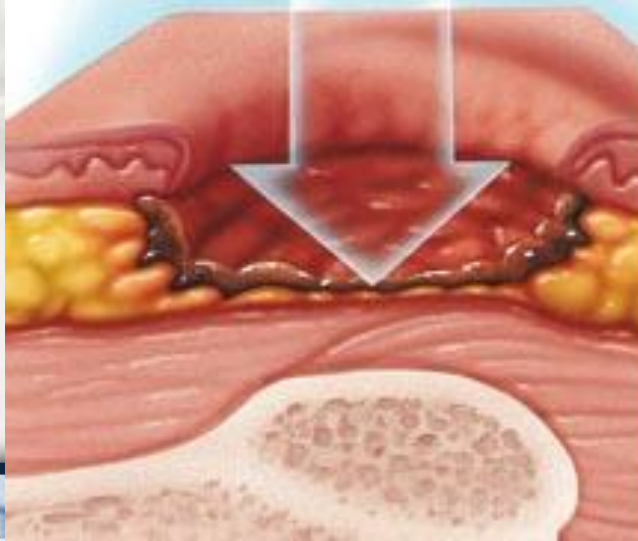
Stage 2

Skin is broken to
epidermis or dermis



Stage 3

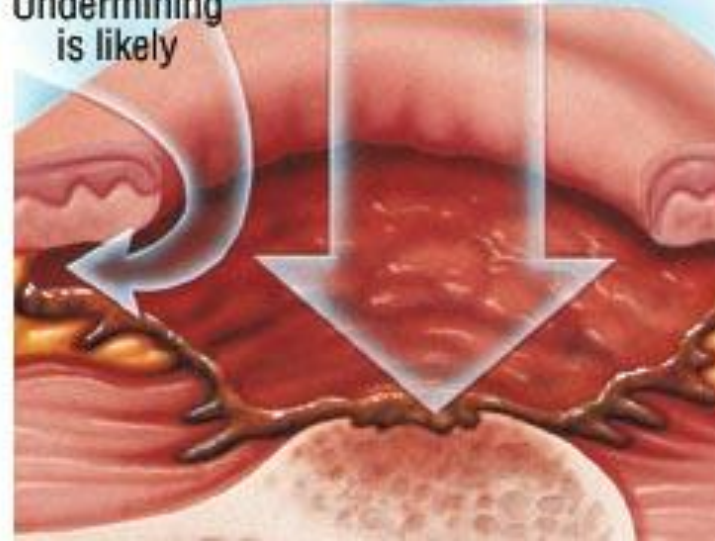
Ulcer extends to
subcutaneous fat layer

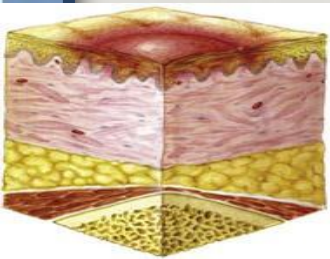


Stage 4

Ulcer extends to
muscle or bone

Undermining
is likely

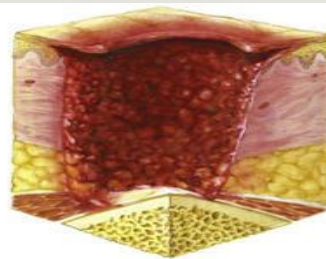




Stage 1



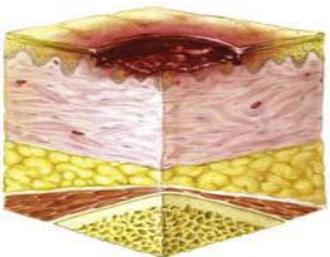
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Stage 4



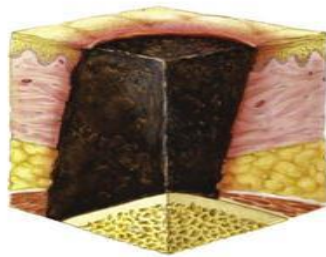
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Stage 2



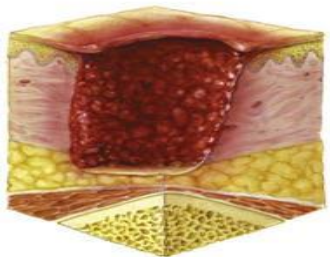
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Unstageable



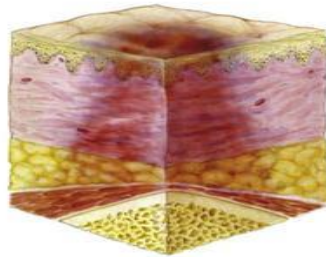
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Stage 3



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Suspected deep tissue injury



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PUPPS 3 – The National Pressure Ulcer Advisory Panel (NPUAP) Pressure Ulcer Staging System

Pressure ulcers are classified by the depth of tissue damage present.

The following staging of pressure ulcers are recommended for use by the Australian Wound Management Association, which is consistent with the recommendations of the National Pressure Ulcer Advisory Panel (NPUAP) U.S.A.

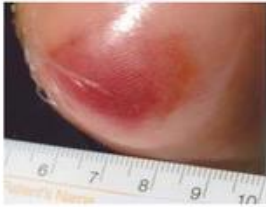
Stage 1

Observable pressure related alteration of intact skin whose indicators as compared to the adjacent or opposite area of the body may include changes in one or more of the following: skin temperature (warmth or coolness), tissue consistency (firm or boggy feel) and/or sensation (pain, itching).

The ulcer appears as a defined area of persistent redness in lightly pigmented skin, whereas in darker skin tones, the ulcer may appear with persistent red, blue or purple hues.



STAGE 1



Please note: heel pressure ulcer covered with a film dressing

Stage 2

Partial thickness skin loss involving epidermis and/or dermis. The ulcer is superficial and presents clinically as an abrasion, blister, or shallow crater.



STAGE 2



Stage 3

Full thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to but not through underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.



STAGE 3



Stage 4

Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone, or supporting structures (for example, tendon or joint capsule). Undermining and sinus tracts may also be associated with Stage 4 pressure ulcers.



STAGE 4



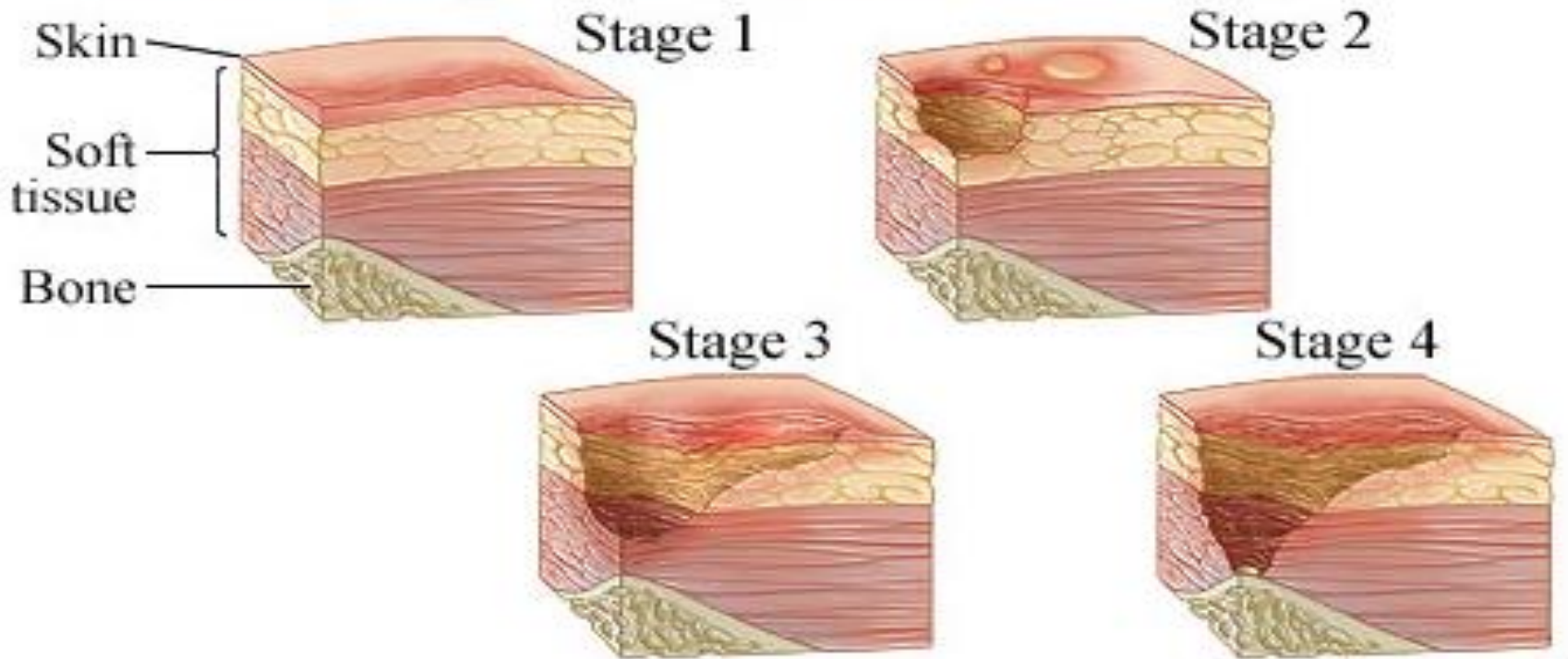


MANAGEMENT

- The most important care for a person at risk for pressure ulcers and those with bedsores is the **redistribution of pressure so that no pressure is applied to the pressure ulcer.**
- **Debridement** and **Dressing** is helpful in existing cases.
- Stage 1&2 > **Day care settings**
- Stage 3&4 > **Surgery**

Fecal diversion + urinary diversion to keep the ulcer as clean as possible till closing it in a proper way

Stages of Pressure Sores



prevention :



**Did you turn
me today?**

**People who can't move
themselves need your help.**

For more information on pressure ulcer prevention please visit
www.preventpressuresulcers.ca



Canadian Association
of Wound Care




Association canadienne
de soins des plaies

www.cawc.ca

Chronic Wounds

🛡️ Chronic wounds are much easier to prevent than to treat.

🛡️  The best way to prevent a chronic wound is to actively and appropriately manage chronic medical conditions such as diabetes, high blood pressure, venous insufficiency and peripheral neuropathy.



Skin should be routinely inspected in these individuals. Steps should be taken to prevent trauma to the skin of the legs and feet, such as wearing shoes, ensuring clothing is not wrinkled or bunched over bony areas and maintaining proper hygiene and nutrition.

②



If a cut or wound does occur, immediate care and attention should be provided.

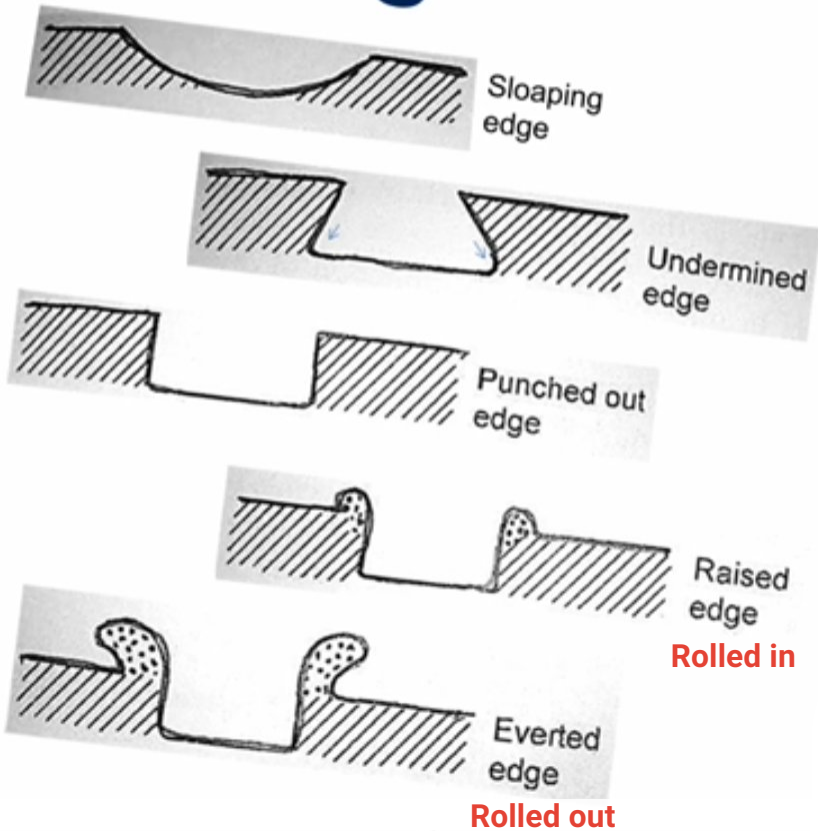
③

Malignant transformation of chronic wounds

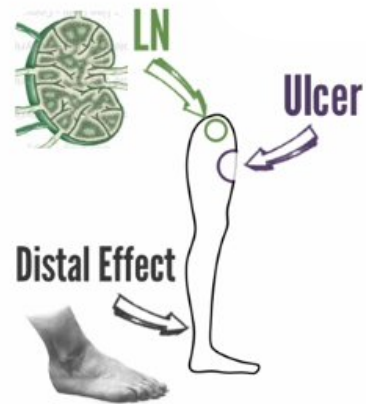
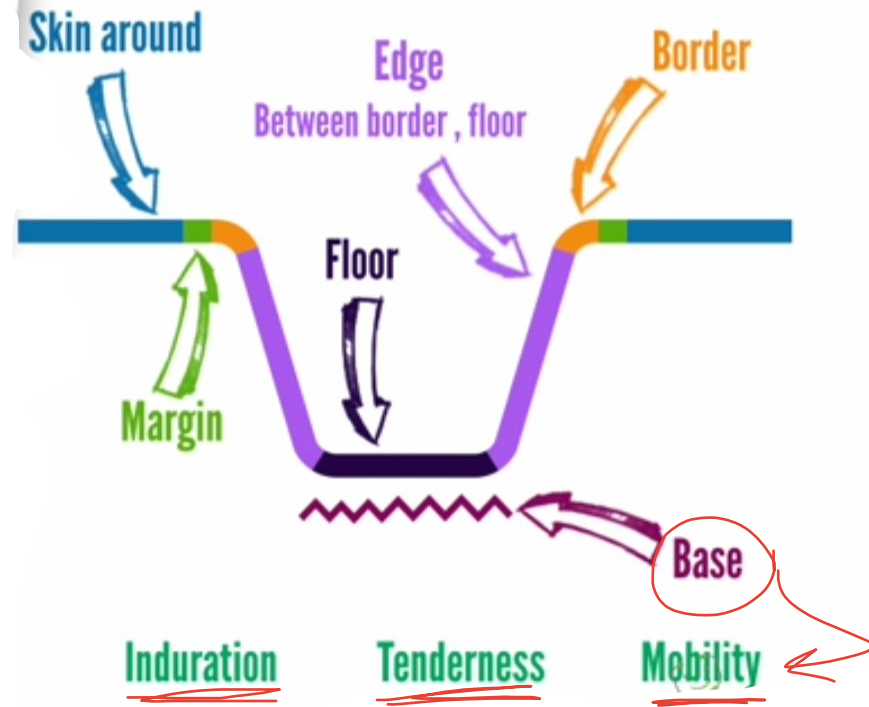
- Any wound that does not heal for a prolonged period of time is prone to malignant transformation (Marjolin Ulcer)
 - >> occurs in any chronic wound
 - >> usually after 7-15 years after the initial wound

A Marjolin ulcer is an aggressive and rare type of skin cancer that grows from burns, poorly healing wounds, or scars.
- Malignant wounds are differentiated clinically from non-malignant wounds by the presence of overturned wound edges.
- In patients with suspected malignant transformations, biopsy of the wound edges must be performed to rule out malignancy.
- Cancers arising de novo in chronic wounds include both squamous and rarely basal cell carcinomas.

Edge



Ulcer description 10



5 Types of ulcer Edges :

