WOUNDS

Trauma to any of the tissues of the body, especially that caused by physical means and with interruption of continuity

A surgical incision
Classification of wound

**Tidy wound**
- Incised
- Healthy tissues
- Seldom tissue loss
  - rare fracture

**Untidy wound**
- Crushed or avulsed Clean Contaminated
  - Devitalised tissues
- Often tissue loss
  - fracture common

rare fracture
Classification Of Surgical Wound

Clean wounds •
Clean contaminated •
Contaminated
Dirty •
TIDY & UNTIDY TYPES

TIDY WOUND – PRIMARY SUTURING

UNTIDY WOUND—SUTURING AFTER EXCISION&CLEANING
Types of wound according to mode of damage

Incised wounds
Abrasions •

Crush injuries •

Degloving injury •

Gunshot wounds •
Burns •
Incised Wound

Caused by a sharp instrument •
Common causes are knives and •
glass

Lacerated wound : associated with tissue tearing
Incised wound
Abrasions

Damage to the body surface resulting from friction
Characterized by superficial bruising and loss of varying thickness of skin and underlying tissue
Dirt and foreign bodies are frequently embedded in the tissues
Abrasion wound
Crush Injuries

Due to severe pressure •
Massive tissue destruction although the skin is not breached •
Often accompanied by degloving and compartment syndrome •
Crush injury
Degloving Injury

Result from shearing forces that causes parallel tissue planes to move against each other

I.e. a hand caught in rollers or moving machinery

Large areas of apparently intact skin may be deprived of blood supply because rupture of feeding vessel
Degloving injury
Gunshot wound

Low velocity (shotguns)
or high velocity
(military rifles)
cause massive tissue
destructions after skin
penetration
Gun shot injury
Haematoma and contusion
Others

Bites  •
Puncture wounds or avulsions  •
Small animal bites  •
children  •
Human bites  •
ear, tips of nose and lower lip injuries  •
Bites wounds highly virulent  •
Puncture wounds  •
Sharp objects i.e needle stick injuries  •
Wound Healing

Restoration of integrity to injured tissues by replacement of dead tissue with viable tissue
Factors influencing wound healing

Site of the wound •
Structures involved •
Mechanism of wounding •
Contamination •
Loss of tissue •
Other local factors •
Vascular insufficiency, previous radiation, pressure •
Systemic factors, malnutrition or vitamin and minerals •
Diseases (diabetes mellitus) •

Immune deficiency •
Medication (steroid) •
Immune deficiency (chemotherapy, AIDS) •
Smoking •
Natural Phases of Wound Healing

1. Injured Tissue and Inflammation
2. New Vessel and Tissue Remodeling
3. Healed Wound
Phases of Wound Healing

Lag phase (2-3 days) •
Inflammatory response •
Incremental/Proliferative phase (3 months) •
Fibroblast migration •
Capillary in growth (granulation tissue) •
Collagen synthesis with rapid gain in tensile strength •
Wound contraction •
Plateau/Maturation phase (6 months) •
Organization of scar •
Slow final gain in tensile strength (80% or original strength •
Lag Phase
inflammatory phase

Characterized by inflammatory response •
Capillary permeability increase •
protein rich exudate accumulates •
Collagen synthesized •
inflammatory cells migration to the area •
dead tissue removed by macrophages •
capillaries at the wound edges begin to proliferate
Proliferative Phase

Progressive collagen synthesis by fibroblast •
increase in tensile strength •
Increased collagen turnover in areas remote from the wound •
Systemic stimulus for fibroblastic activity •
Collagen synthesis increase in 3 weeks •
Gain in tensile strength accelerates •
Old collagen undergoes lysis •
New collagen laid down •
Maturation phase

- Gain in tensile strength levels off
- Excess collagen removed during process
- Number of fibroblasts and inflammatory cells declines
- Orientation of collagen fibrin in the direction of local mechanical forces
- Increase tensile strength for 6 months
- Skin & fascia recover only 80% of their original strength
Classification of Wound Healing

Primary Intention •
Secondary Intention •
Tertiary Intention •
Primary Intention
Most surgical wounds
Wound edges opposed
directly next to one another and
little tissue loss
Normal healing
Minimal scarring occurs
Wound closure
sutures, staples, or adhesive
Primary intension
Secondary Intention

Wound left open •
heals by granulation, contraction and epithelialisation
Results in a broader & poorer scar •
Wound may pack with gauze or use drainage system
Wound care must be performed daily •
to encourage wound debris removal to allow for granulation tissue formation
Secondary intension
Tertiary Intention

Also called delayed primary intention •
Wound initially left open •
edges opposed later when healing conditions •
favourable

For wound in which primary intention was •
preferred but not possible due to contamination.
Delay in primary closure to allow clear infection, •
wound contracture and create granulation base. •
Tertiary intension
Types of skin wound

Partial thickness wound •
Full thickness wound •
Partial thickness wound

Involve epidermis and superficial dermis •
Sparing adnexal structure: hair follicle, sweat gland, sebaceous gland •
Re-epithelialization from edge of wound and adnexal structure •
Complete healing with minimal or no scar •
Pigmentary change may occur •
Full thickness wound

Involve deep dermis •
Adnexal structure destruction •
Re-epithelialization only from epithelium • margin
Contraction facilitate re-epithelialization by • bringing wound edge together
Heal with scar •
Managing the acute wound

Examine the patient as a whole •
Stop bleeding •
Adequate analgesia and anaesthesia •
Cleaning •
Exploration •
Debridement •
Repair of structures •
Replacement of loss tissue where indicated •
Skin cover if required •
Skin closure without tension •
Chronic wounds (ulcer)

Break in epithelial continuity, prolong • inflamm. Phase lead to overgrowth of granulation tissue and attempt to heal by scar leave a fibrotic margin. Necrotic tissue at the center called debris.
Leg ulcer and pressure sore •
Aetiology of leg ulcer

Venous •
Arterial •
Arteritis •
Trauma •
Chronic infection T.B, syphilis •
Neoplastic squemous cell carcinoma sarcoma •
and basal cell carcinoma.
Diabetic ulcer
Basal cell carcinoma
Pressure sore

Tissue necrosis with ulceration due to prolonged pressure (bed sore)

High incidence in paraplegic patients

Commonest site (ischium, trochentric, sacrum, heel, malleolus, occiput)

If pressure exceed capillary occlusive pressure 30 mm Hg lead to anoxia and necrosis and ulceration
Management of pressure sore

Prevention is the best treatment with good skin care special pressure dispersion cushion or foam

Patient should turn every 2 hr

Surgical management follows the same principles involved in acute wound treatment

Closure with flap
Type of scar

Normal scar •
: normal wound healing process

Abnormal scar •
: Multiple disturbance in wound healing process
: Excessive collagen production
: Reduce collagen degradation
Types of abnormal scar

Atrophic: is pale, flat, and stretched in appearance often appearing on the back and area of tension it is easily traumatised
Hypertrophic scar

Linear, red, raised firm scar result from prolonged inflammatory phase of wound healing and unfavourable scar site (chest, ear lobe)

Confined to the original injury site

Pruritic, but not pain or hyperesthesia

Common affect under constant pressure and stretching area

Usually arise within 1 month of injury
Hypertrophic scar (cont.)

Spontaneous improvement during first 6 month
Keloid

Firm, irregularly shape •
Thin epithelium •
Caused by surgical procedure, burn, trauma, inflammation •
Spread beyond the limit of original injury •
Appear within wk. or yr. •
Aetiology unknown but associated with elevated growth factor, deeply pigmented skin inherited tendency, certain area in the body (danger triangle)

Histology show hypervascularity and excess collagen but •
more in keloid
Keloid (cont.)

Persist over time •
Early lesion : red, tender, rubbery, may be • telangiectatic
Old lesion : brown, pruritic, pain, • hyperesthesia
Varying in size and number •
Treatment

: pressure
Silicone gel sheeting
Intralesional steroid
Excision and steroid injection
Excision and post-operative radiation
Intralesional excision (keloid only)
Laser
Vit. E
Keloid
Hypertrophic scar
Avoidable scarring

1- good management of acute wound •
2- proper scrubbing or cleansing of the wound if a dirt (tattooed scar) •
3- well recognition of normal landmark like lip vermilion •
4- early removal of stitches •
5- tension free •
6- fine sutur material •
Subcuticular suturing •
Thank you