

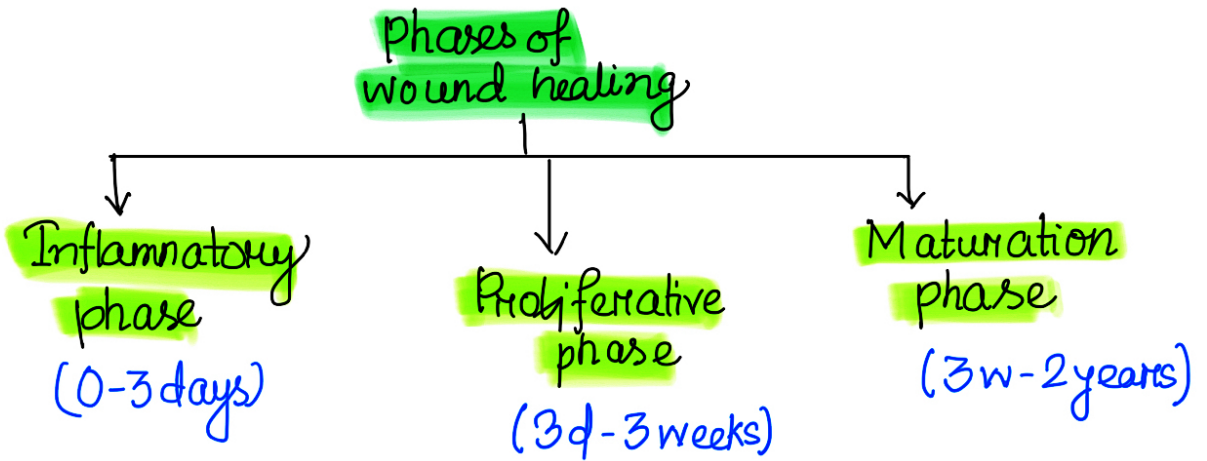


Ad

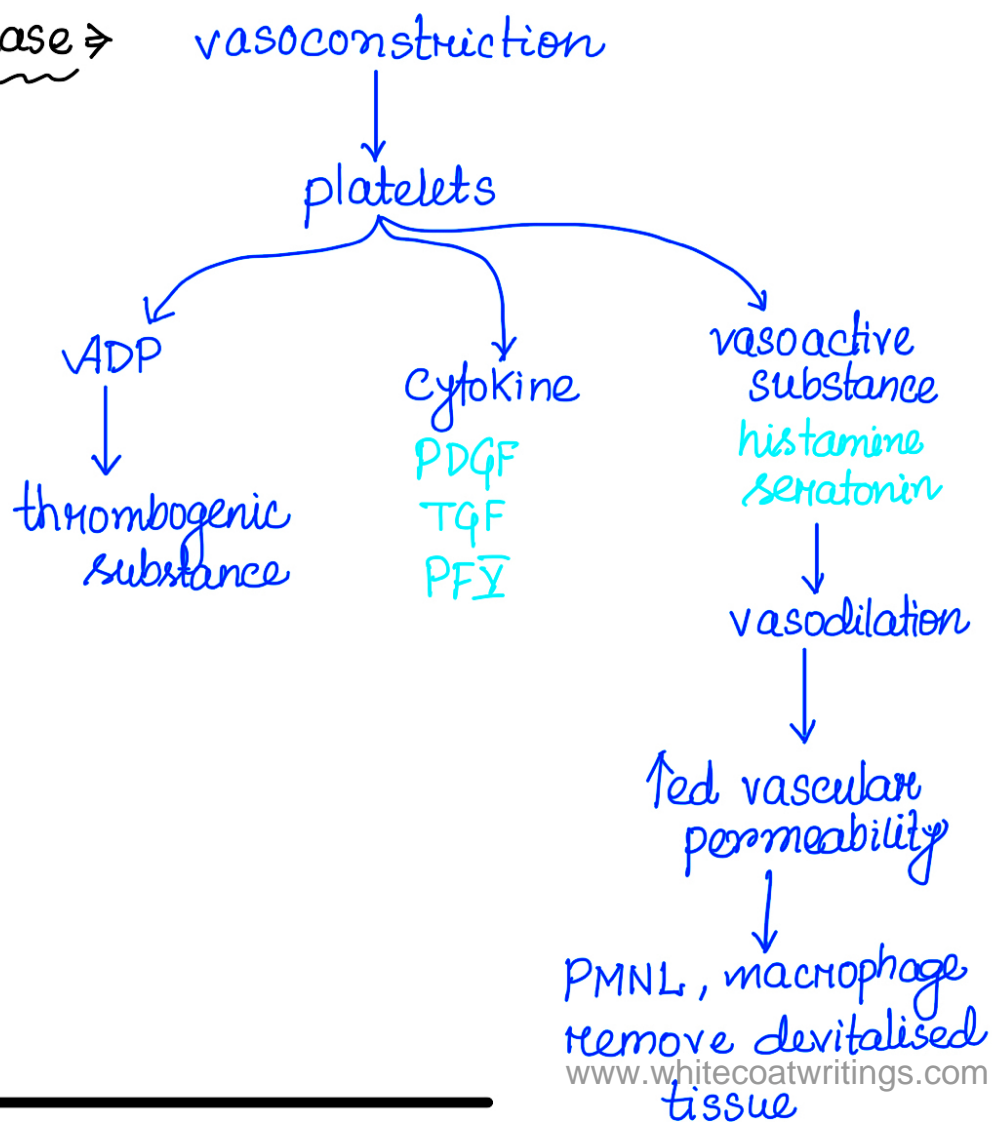


WOUND HEALING

wound → breach in integrity of tissue



Inflammatory phase →





Ad



↓
PMNL, macrophage
remove devitalised
tissue

Proliferative phase ⇒

fibroblast



lay down type IV collagen
in haphazard manner.

Maturation phase ⇒

type IV collagen



transformatⁿ
1:1 ratio

type I collagen



alignment of collagen
in regular manner



wound maturation.

→ in healthy, young individual max. 80% regain is possible.

Impairment of normal wound healing

DIABETES MELLITUS

sugar laden tissue



↑ inf.



↑↑ (increased) PMNL, macrophage

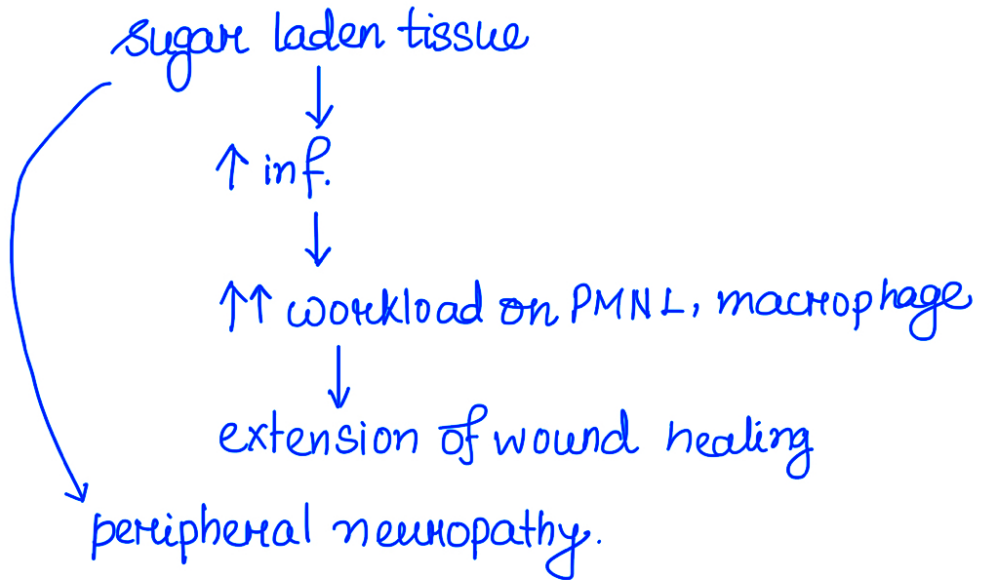


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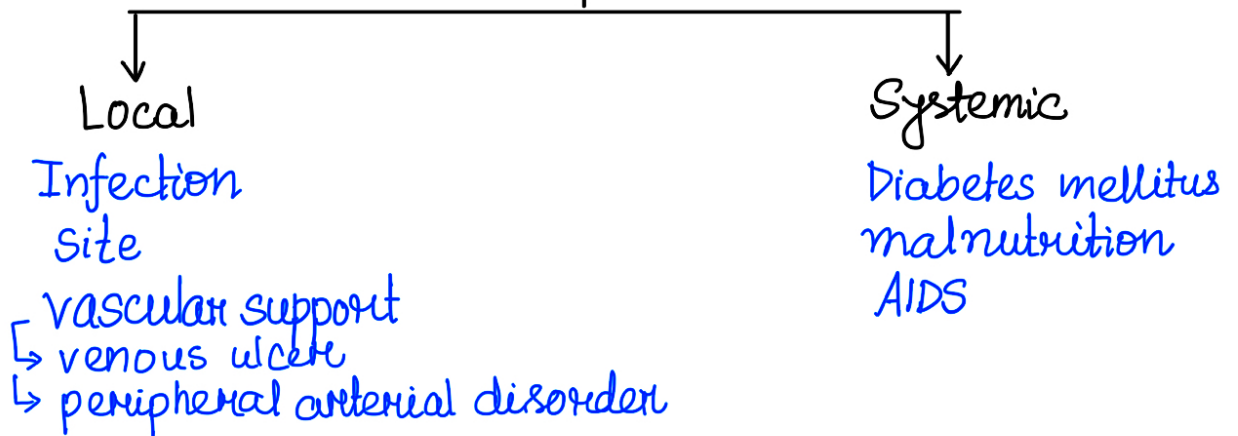


Impairment of normal wound healing

DIABETES MELLITUS



Factors affecting wound healing



healing by 1st intention ⇒ normal time in healing
 ↓
 linear, fine, supple, thin scar

2nd intention ⇒ infectⁿ occurs → wound heals
 ↓
 scar hard at places, granulosomatous

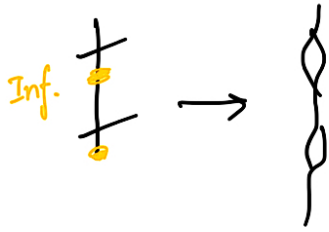




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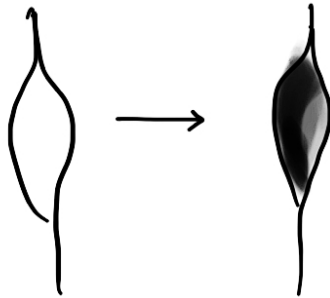


2' intention \Rightarrow infectⁿ occurs \rightarrow wound heals \downarrow



scar hard at places,
granulomatous

3' intention \Rightarrow wound remain open \rightarrow stitches not tightened
(stoma)



\downarrow
wound healing
naturally by
granulation

Wound Healing

Geetika Khanna +

Process of Scar formation

① Angiogenesis

Importance - wound healing
collateral circulatⁿ in ischemia
tumor growth.

NO \rightarrow vasodilation

VEGF \rightarrow \uparrow permeability



• separation of pericytes from
abluminal surface



Ad



VEGF → ↑ permeability



- separation of pericytes from abluminal surface
- basement membrane breakdown



vessel sprouts



migration of endothelial cells to the area of injury



Proliferation of endothelial cells just behind leading front tip



remodelling into capillary tube



Pericyte/smooth muscle recruitment



- suppression of endothelial proliferation
- deposition of basement membrane

Growth factors -

VEGFA → endothelial proliferation migration



↑ NO → vasodilation

PDGF



~~EGF (2) → ↑ migration of mφ & fibroblast~~



Aa



Growth factors - VEGFA → endothelial proliferation
migration

↓

↑NO → vasodilation

FGF-2 → ↑ migration of mφ & fibroblast

PDGF ↓

↳ ↑ epithelial cell migration to cover wounds

Angio proteins. Ang-1 & 2 ↓
structural maturation of new blood vessels.

TGFβ → stabilization
suppress endothelial migratⁿ & proliferatⁿ

Notch signalling - regulatⁿ

ECM protein.

Enzymes - MMP.

② Deposition of connective tissue

migratⁿ & proliferatⁿ of fibroblast
to site of injury

↓
ECM protein productⁿ

↓
deposition.

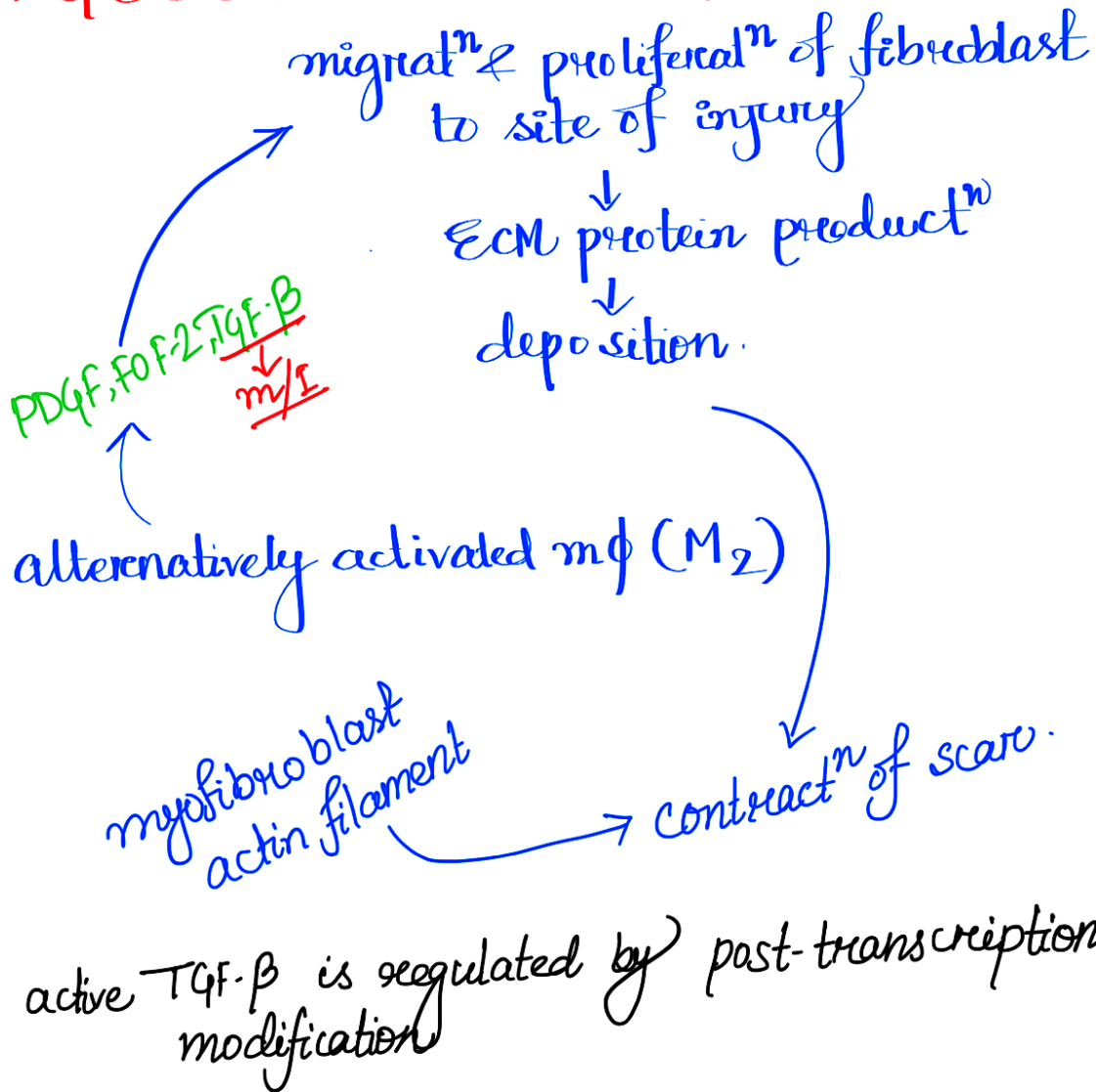
VEGF, FGF-2, TGF-β
mφ & fibroblast



Ad



② Deposition of connective tissue



③ Remodelling of connective tissue

Matrix Metalloproteinases (MMP) + Zn

MMP-1, 2, 3 → cleave fibrillar collagen
MMP-2, -9 → cleave amorphous collagen
fibronectin.

Zymogen $\xrightarrow[\text{protease}]{\text{plasmin}}$ MMP

↳ tightly regulate.



Aa



myofibroblastic
actin filament \rightarrow contractⁿ of scar

active TGF- β is regulated by post-transcriptional modification

③ Remodelling of connective tissue

Matrix Metalloproteinases (MMP) + Zn

MMP-1, 2, 3 \rightarrow cleave fibrillar collagen

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fibronectin.

Zymogen $\xrightarrow[\text{protease}]{\text{plasmin}}$ MMP
 \hookrightarrow tightly regulate.

TIMP \rightarrow XMMP

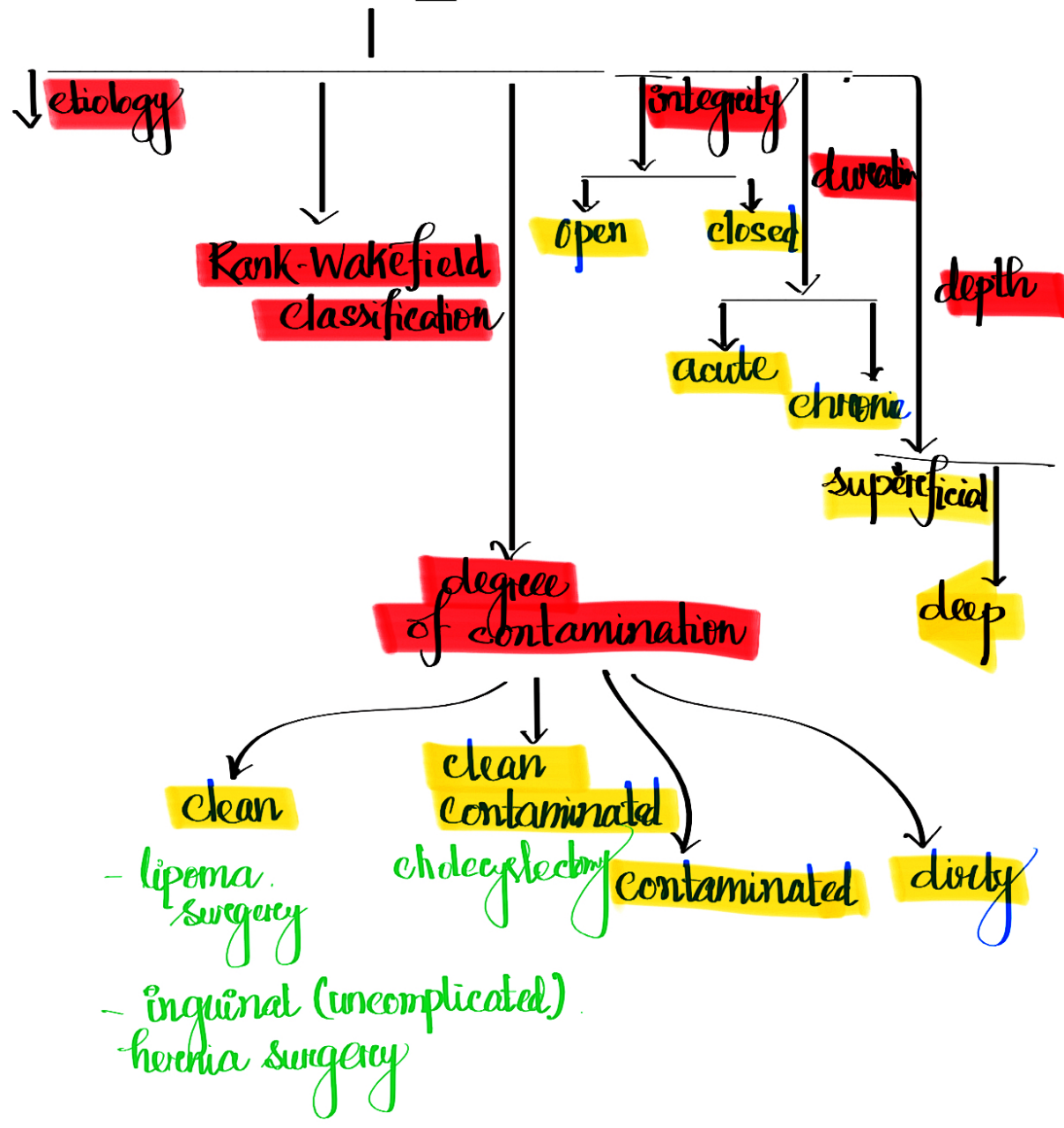
ADAM \rightarrow bind to plasmamembrane
release extracellular domains of
TNF, TGF β , EGF

balance b/w synthesis & degradatⁿ

type III \downarrow \rightarrow type I collagen

maximum 80% strength can be achieved.

Wound classification



* Moist wound healing exudate facilitates wound healing.
 ↓
 lysozymes, WBCs, enzymes.

appearance
 v sloughy wound
 necrotic wound



Aa



lysozymes, WBCs, enzymes.

appearance

- sloughy wound
- necrotic wound
- infected wound
- granulating wound
- epithelialising wound.

wound characteristics - odor, color, etc.

common causes of chronic wounds.

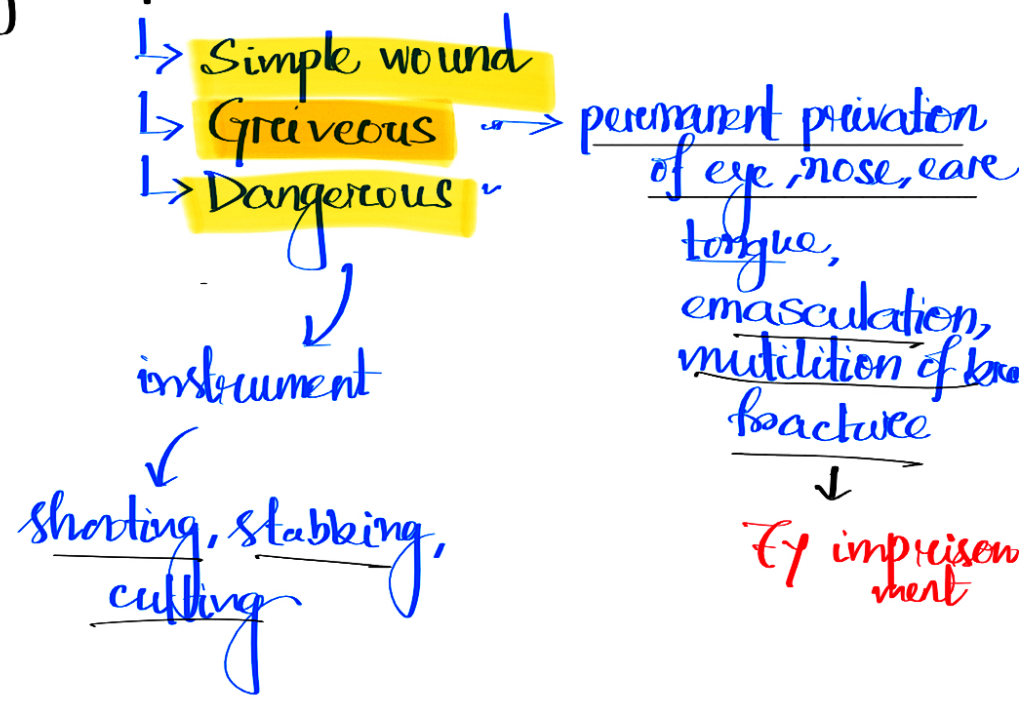
- venous ulcers
- diabetic foot ulcers
- Pressure ulcers.
- ischemic ulcers
- malignant ulcers

Local wound care

- Tissue management
- Inflammatory management
- Moist control
- Epithelial advancement.

legal Aspect

Legal Aspect



Medicolegal reporting of Injury

- ↳ Preamble identification
- ↳ Body - general examination
- ↳ Opinion - type of weapon, time of injury, severity

* Consent for examination