Pathology

INFLAMMATION

LECTURE (5)

As a doctor you should know what can threaten your patient's life
you should know what makes your patient suffers from pain
THAT'S WHY YOU LEARN PATHOLOGY

Definition: BLUE Examples:GREEN Important: RED Extra explanation:GRAY Disease names: **UNDERLINE**.

Lecture(5) Outlines

- Regeneration & scar formation.
- Proliferative capacity of tissue cells.
- Healing by first intention (primary union).
- Healing by second intention (secondary union).
- Significance of **myofibroblast** in the two types of healing.
- Abnormal repair.

Regeneration, repair, and proliferative capacity of cells

Regeneration, repair or both occurring depends on the regenerative capacity of the originally damaged cells.

We have 3 types of cells

- Labile cells (unstable)
  - Rapidly regenerating cells (short life-span).
    Example: epidermis of skin.
- Stable cells
  - Longer-living cells with slower mitotic rate, but with proper conditions they can greatly to some extent.
    Example: Liver and renal tubular cells
- Permanent cells
  - Long life span with no mitotic activity in postnatal life.
    Example: The neurons of the CNS

Regeneration, repair, and proliferative capacity of cells (Contd.)

Supporting tissues

Collagens: a series of **complex polypeptides** secreted by Fibroblasts, it binds to the epithelial and various connective tissues where appropriate, thus providing tensile strength (Substances bear to each other strongly)

Basement membranes lie at the interface of cells and **stroma**. They support the overlaying cells. Materials found in Basement membranes include Entactin, Heparin Sulfate, Laminin, Proteoglycan and type IV collagen.

Fibroblasts?
Type of connective tissue cell that synthesizes the extracellular matrix and collagen.

Healing by first intention (primary union)

Healing by first intention occurs when edges of the wound are approximated and the wound is quickly covered with epithelium and bound together by **collagen**.

At first, the surface epithelial gap and opposed edges of the connective tissue contain blood clot and debris.
Epithelium is regenerated from the edges of the wound. **Capillaries, neutrophils, macrophages** and **fibrocytes** migrates into the clot.
Within a few days, scar (patch of dried, clotted blood) at the surface falls revealing **re-epithelialization** and the blood clot in the apposed tissues is removed by **macrophages**.
Endothelial cells proliferate with the laying down of **collagen** by fibroblasts, producing **granulation tissue** (a lot of edema).

1. **Neutrophils** decrease in numbers.
2. **Macrophages** increase in number.
3. **Collagen** in the gap increases.
4. **Blood** vessels decrease in number.
5. The scar begins to contract.

Healing by first intention is best exemplified by the healing of an appeased surgical incision.

Healing by second intention (secondary union)

YouTube

Explanation of two types of healing :)

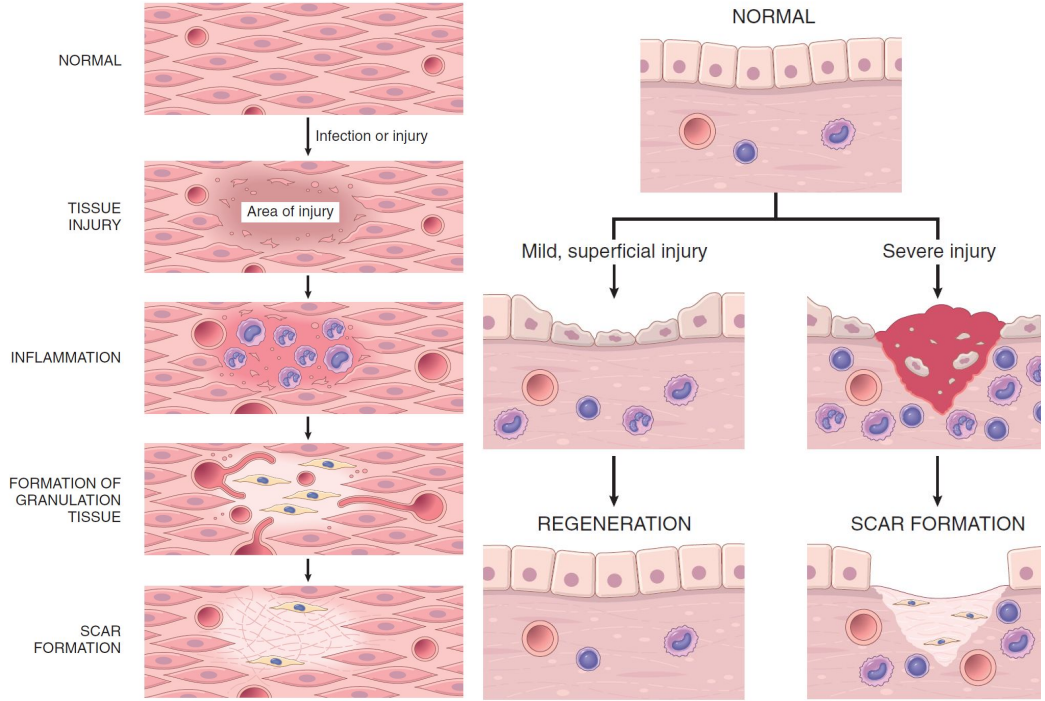
Edges of the wound **cannot** be opposed in healing by second intention, leaving a defect containing blood clot and debris. The process of wound healing is similar to that in first intention, but takes much longer. The same cells take part in the process, but granulation tissue is much more pronounced.

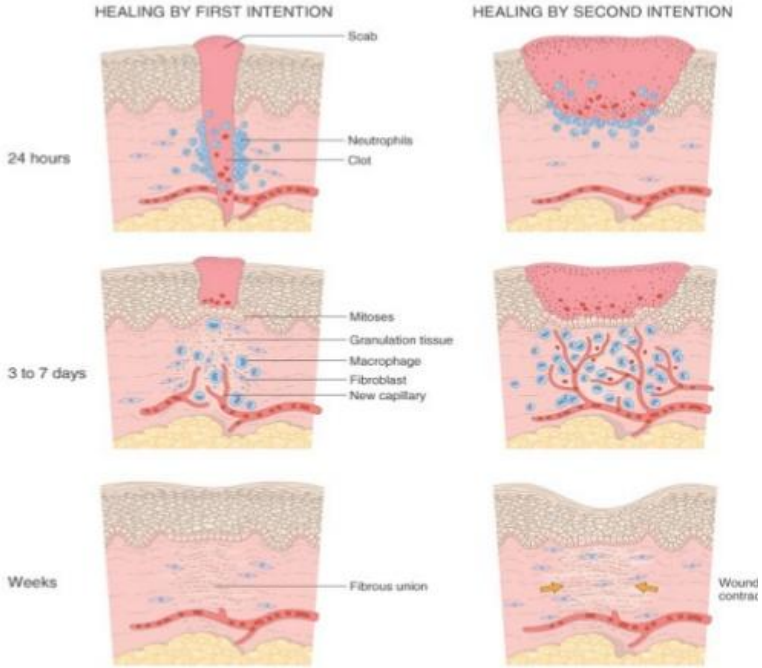
Significance of myofibroblasts

During tissue repair (both types of healing), the myofibroblasts (contractile cells with properties of both **fibroblasts** and **smooth muscle cells**), migrate to the wound where they generate the adhesive and **tensile forces** required for wound **closure.** Tensile strength of the wound in both kinds of healing gradually increases with more **fibroblasts** activity and the laying down of **collagen**.

Note:
- Healing by First and Second intentions are similar in the process, activity and the fate of the wound, but they differ in time, as the second intention takes longer.

Extra explanation of healing





Abnormal repair

If wound repair does not occur properly (abnormal), the **laying down of excessive collagen** will result in the formation of **Keloid**[1] and **Fibrous** adhesion formation.

Obstruction of healing leads to:

- Bacterial infection of wound
- Presence of foreign bodies
- Poor blood supply (ischemia)
- Lack of mobility

1. **Keloid** is an area of irregular fibrous tissue formed at the site of scar or injury.

Abnormal repair (contd.)

Deficient scar formation may result from
- Deficiencies of Vitamin C
- Severe protein deficiencies

Wound separation at wound margin (wound dehiscence) may result from
- Retarded[1] wound healing
- Deficient scar formation

Note:
If a large wound **cannot** be covered by epithelium, the resulting ulcer may require a **skin graft**.
Wound contractures[2] are related to the action of **myofibroblasts**
This is seen especially following **burns**.

1. The word **retarded** here means delayed.
2. **Wound Contractures** is wound healing that leads to physical deformity, like losing the ability to flex your elbow joint

HOPEFULLY WE DID A GREAT JOB

ONLINE TEST

FOR ANY QUESTIONS AND SUGGESTIONS CONTACT US ...

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To make sure that all students are aware of any changes, please check out this link to know if there are any additions or changes.
The same link will be used for all of our work:
(Pathology Edit)

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DIFFICULTIES IN YOUR LIFE DON'T COME TO DESTROY YOU.. BEST OF LUCK