PATHOLOGY

بسم الله الرحمن الرحيم

Final– Lecture #3

Repair (pt.3)

﴿ وَإِن تَتَوَلَّوْا يَسْتَبْدِلْ قَوْمًا غَيْرَكُمْ ثُمَّ لَا يَكُونُوا أَمْثَالَكُم ﴾

اللهم استعملنا ولا تستبدلنا

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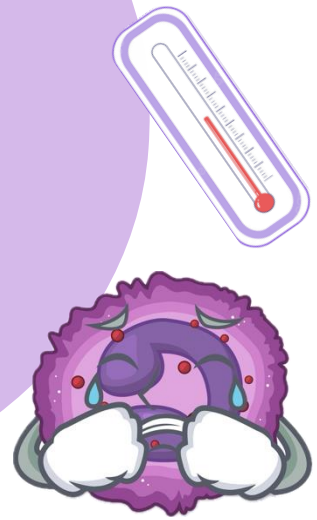

فريق دوبامين العلمي - THE SCIENTIFIC TEAM OF DOPAMINE

APPROVED
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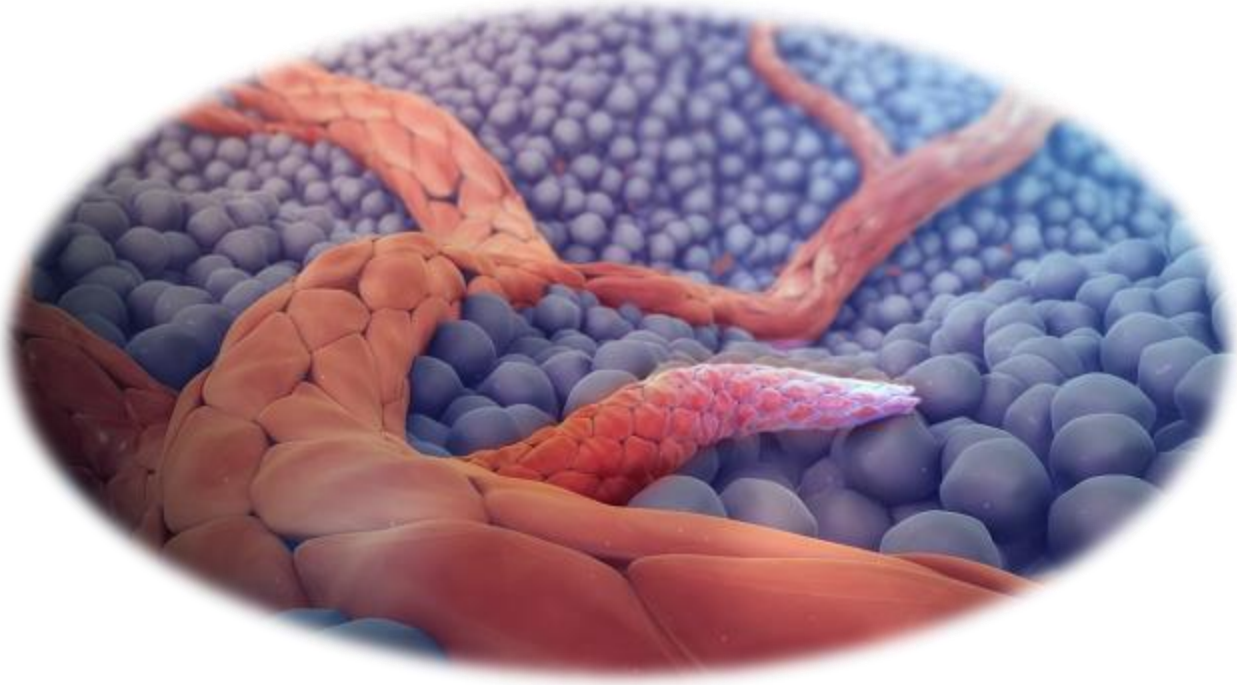
- Quiz for the previous lecture :



Lecture 9

The first 28 minutes of the lecture are a review of lectures 7 and 8.

اللهم إني أبدأ دراستي بنية خالصة لك، فوفقني يا أرحم الراحمين، وارزقني التوفيق في كل ما أقرأ وأدرس، اللهم اجعل دراستي هذه سببًا لرفع درجتي في الدنيا والآخرة، وبارك لي في وقتي، وارزقني التوفيق في امتحاناتي ، اللهم اجعلني من الذين يسهل عليهم العلم، واجعل لي من كل صعوبة في الدراسة سهولة، ومن كل عائق في الطريق إزالة

ABNORMAL HEALING

- **Deficient scar formation**
- **Excessive repair** more scar forms
- **Contractures**

DEFICIENT HEALING:

- **Venous leg ulcers**

✓ This condition occurs when standing for long periods of time, such as for female teachers, and leads to the development of varicose veins (دوالي)These veins form due to increased pressure in the veins.

- **Arterial ulcers**

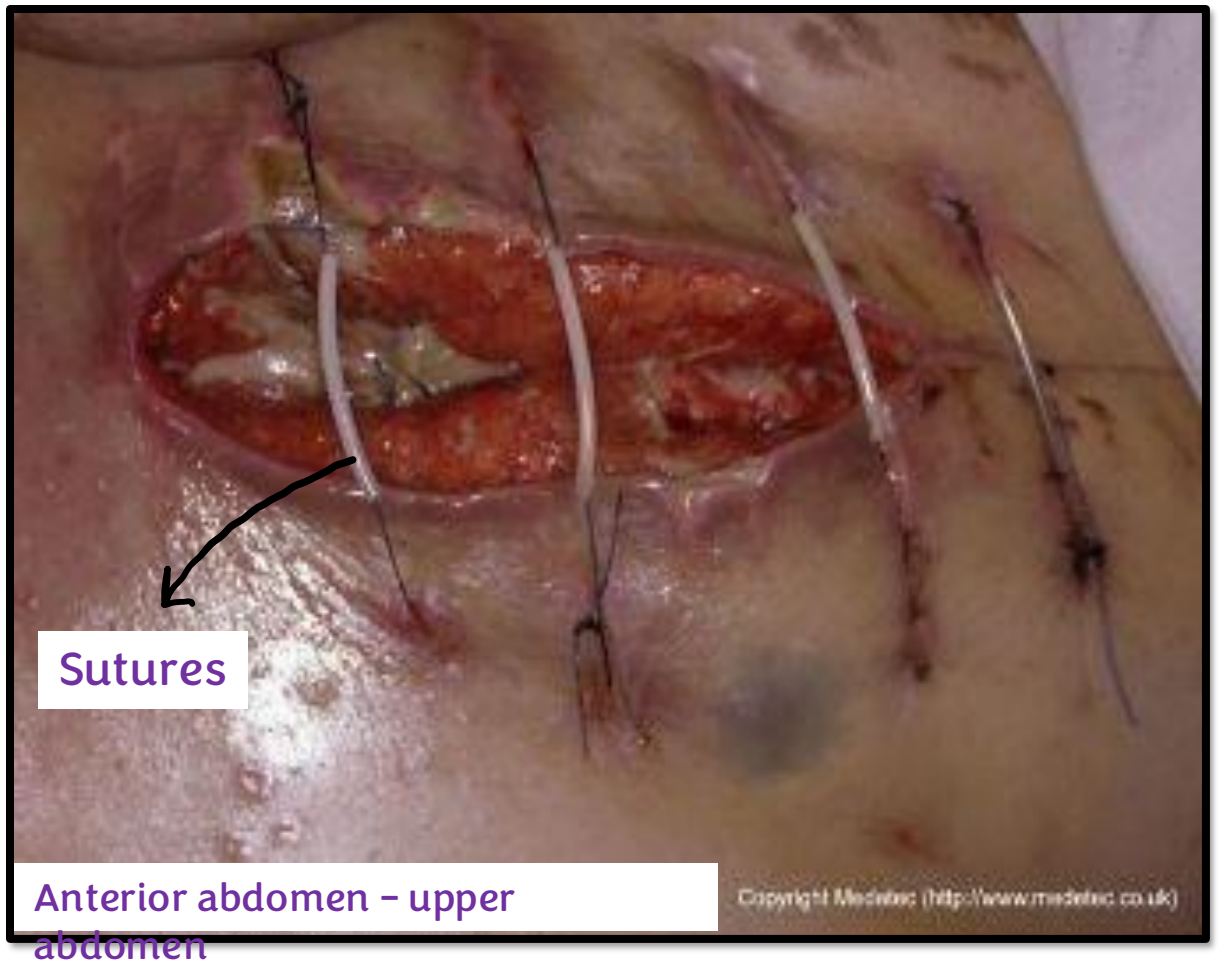
✓ There is a deficiency in arterial perfusion and blood supply, with no angiogenesis occurring, as seen in conditions like chronic atherosclerosis, older age, and hypertension. This leads to more severe deep ulcers compared to venous ulcers.

- **Pressure sores**
  - ✓ pressure ulcers
- **Diabetic ulcers**

✓ dedicated diabetic foot clinics for this purpose, such as the one at Jordan University Hospital and others within diabetes care centers. These clinics provide specialized treatment for specific types of ulcers that are difficult to treat and need careful management to prevent complications.

- ***** Wound dehiscence**

Wound dehiscence:



Causes:

· It occurs due to weak sutures and poor surgical techniques.

-Surgeons need to be especially careful with wounds in obese patients, as they may require additional support such as plasters, belts, and gauze.

Underlying Mechanism:

· The main cause of wound dehiscence is increased intra-abdominal pressure.

A) Venous Ulcers:

- **Location: Classic location for venous ulcers, often found in the lower leg.**
- **Depth: These ulcers are more shallow and less deep compared to arterial ulcers.**
- **Discoloration: The affected area shows dusky brownish-darkish discoloration (the color in area (A), which is due to chronic deposition of iron from increased blood pressure and the prolonged presence of blood in the area over months or years.**

B) Arterial Ulcers:

- **Dangerous Nature: Arterial ulcers are more dangerous due to chronic ischemia**
- **Depth: These ulcers are deeper than venous ulcers because the arterial blood supply is deficient, leading to tissue death and more severe wound formation.**

C) Diabetic Ulcers:

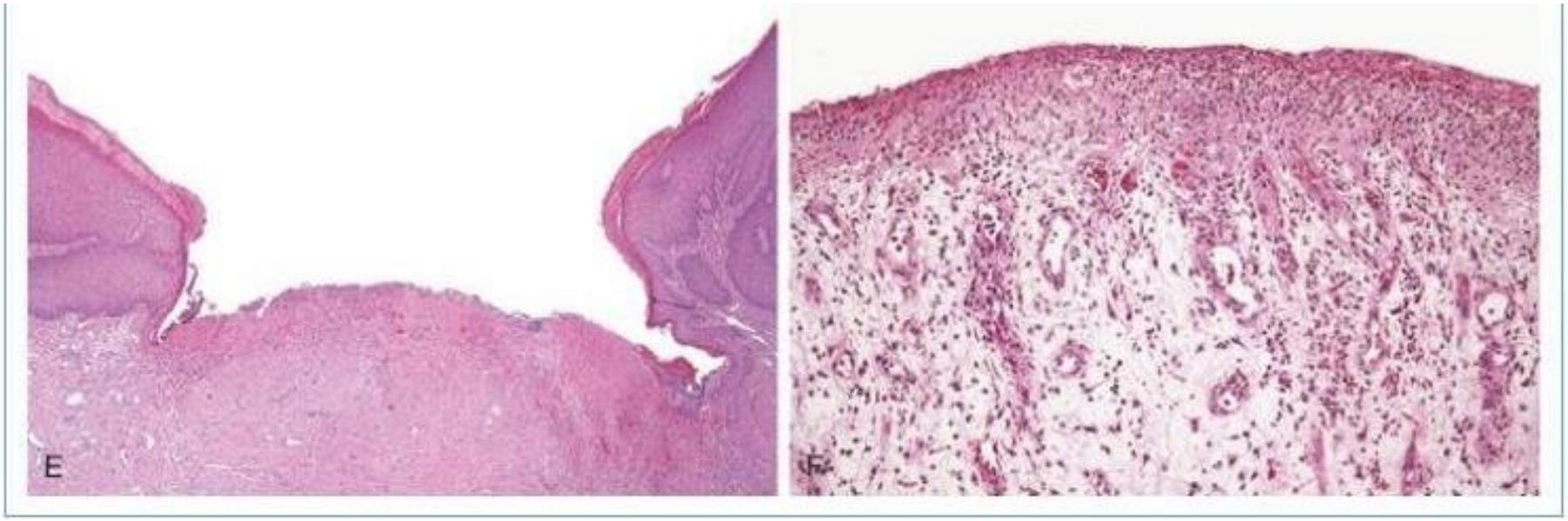
· Patient Condition: These ulcers occur in diabetic foot patients, who often experience difficulty in treating these ulcers.

· Cause: The primary factor is chronic hyperglycemia , which leads to various complications, including peripheral neuropathy. This nerve damage affects sensation in the feet, making patients less aware of injuries that could lead to ulcers.

D) Pressure Sores (Bedsores or Pressure Ulcers):

· Location: Commonly found in areas of the body where bones are close to the skin, such as the lower back and buttocks.
· Cause:
Mechanical pressure: Prolonged compression of tissues against bones causes local ischemia and tissue necrosis, leading to tissue damage and ulcer formation.
· Stroke patients and other bedridden, immobile elderly individuals with multiple morbidities are at higher risk of developing pressure sores.
If patients remain in the same position for extended periods, such as 3 hours, the pressure between the skin and bones obstructs blood vessels, leading to reduced circulation and tissue damage.

· Care Issue: The development of pressure sores often indicates poor nursing care. Regular repositioning of patients is critical to prevent tissue damage and ulcer formation.
· Solution: New electrical beds have been introduced that can automatically reposition patients to reduce the risk of pressure ulcers.



- It is a discontinuation of squamous epithelium, so it is ulcer
- Granulation tissue full with fibroblasts

لا حول ولا قوة إلا بالله

EXCESSIVE SCARRING:

(abnormal healing)

- **Hypertrophic scar:**

✓ Excessive scar tissue that remains confined to the original wound area.

- **Keloid.**

✓ Excessive scar tissue that grows beyond the boundaries of the original wound. It often involves more collagen type 1 and does not look cosmetically appealing.

- **Exuberant granulation tissue (proud flesh)**

✓ This refers to a condition where excessive tissue forms, often seen in cases like cholecystectomy surgery (gallbladder removal). The tissue can appear as a “mountain of flesh” at the site. Doctors rarely see this in practice but it’s mentioned in medical books.

- **Aggressive fibromatosis (desmoid tumor)**
- **Contractures**

The doctor will explain the last two point in more detail in next semester.

Thyroid Surgery Scar

· **Location: The neck.**

· **Description:**

This scar is a result of thyroid surgery, such as a lobectomy or total thyroidectomy.

It is a hypertrophic scar, meaning it is raised and visible but remains confined to the boundaries of the surgical site.

-While the scar is not overly severe, it is noticeable and could have been less visible with more refined surgical techniques, such as subcuticular suturing.

-The appearance of the scar highlights the importance of precision in surgical closure for improved cosmetic results.

Keloid Scars on the Shoulder

· Location: The back of the shoulder.

· Description:

These are keloid scars, which are raised, thickened scars that extend beyond the original wound boundaries.

The scars resulted from shotgun pellet wounds, with each pellet causing an individual keloid.

· Risk Factors:

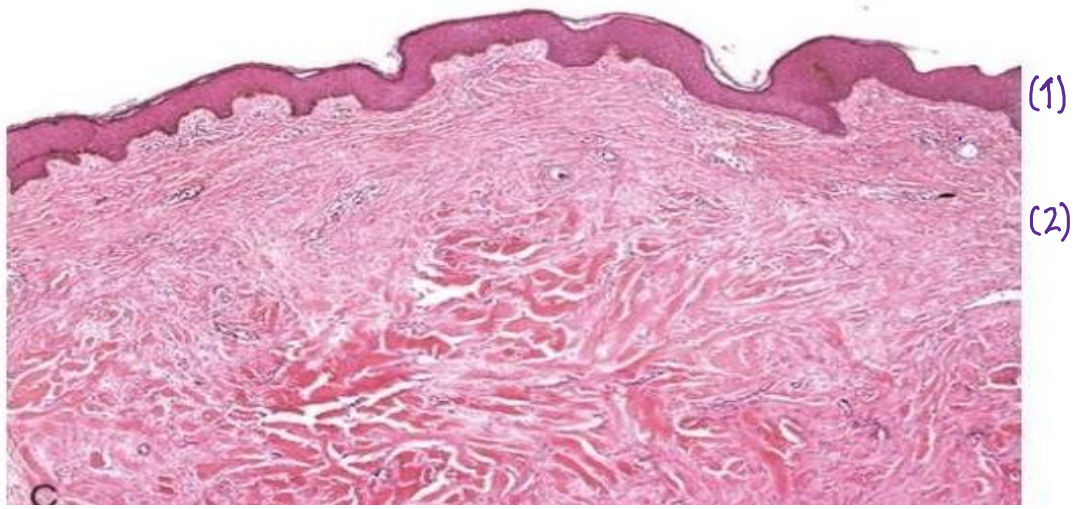
Keloids are more common in individuals with darker skin tones, such as African Americans.

Families with a history of keloid formation often inform surgeons of their predisposition before undergoing surgery.

· Treatment Challenges:

Treating keloids is challenging because surgically removing the scars often leads to the formation of new keloids.

Steroid creams or injections may help reduce scar thickness and elevation, but treatment outcomes vary and can be unpredictable.



Microscopic View of a Keloid Scar

- After surgically removing the scar or keloid, the tissue is examined under a microscope.
- Microscopic Findings:

1. Squamous epithelium: The outer layer of tissue observed.
2. Collagen Type I: The main structural protein found in the scar tissue, indicative of scar formation.

FIBROSIS OF ORGANS:.

Fibrosis and scar formation are common outcomes of the tissue repair process, especially in chronic conditions.

· If a condition involves chronic relapsing episodes or acute exacerbations on top of chronic inflammation, each acute episode contributes a small amount of fibrosis.

· Over time, with repeated cycles of injury and repair (e.g., 100–150 attacks over 15–20 years), this cumulative fibrosis can lead to excessive scarring in the affected organs.

- **Scar and fibrosis: excessive deposition of collagen and ECM.**
- **Continuous infections and immunologic injuries cause organ fibrosis and loss of function**
- **TGF-ß is the most common cytokine of fibrosis**
- **Examples: liver cirrhosis, Idiopathic lung fibrosis, ESKD**

✓ Chronic fibrosis can impair organ structure and function, resulting in long-term complications and reduced tissue elasticity.

End-Stage Kidney Disease and Fibrosis

(ESKD) is characterized by extensive fibrosis within the renal tissue. In many cases, the severity of the fibrosis is so pronounced that it masks the primary disease that led to kidney failure, making it difficult for pathologists to determine the initial cause. Chronic damage, often due to conditions like hypertension or diabetes, culminates in significant scarring, further impairing renal function.

· Liver Reserve:

· The liver has an impressive functional reserve, allowing it to continue working even with significant damage.

· In healthy individuals, only 10-15% of the liver is required for normal functioning.

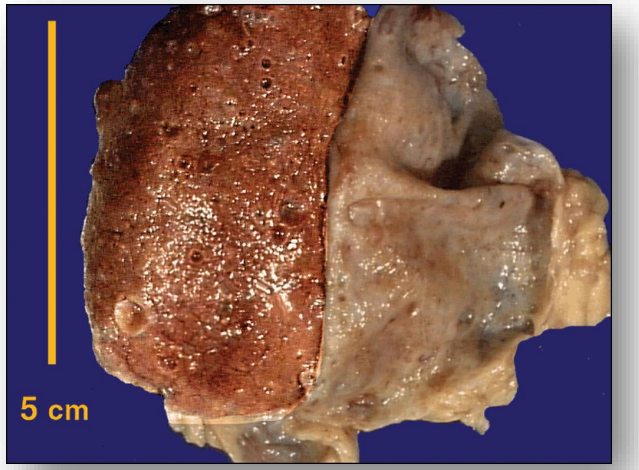
· Even if 70-80% of the liver is removed or damaged, the remaining portion is typically sufficient to maintain normal liver function.

· Kidney Reserve:

· Similarly, the kidney also has a substantial reserve capacity. Many people live healthy lives with one kidney or even half a kidney, as the kidneys have a reserve capacity of 75%.

Advantages: Both the liver and kidneys have significant reserve capacity, allowing for normal functioning even after partial damage.

· Disadvantages:Because of their reserve capacities, diseases affecting these organs often remain silent until advanced stages, Symptoms and signs of chronic renal failure or liver failure typically only appear when more than 80% of the organ is damaged , This delayed onset of symptoms highlights why chronic diseases of these organs can be particularly dangerous—they progress silently until significant and often irreversible damage has occurred.



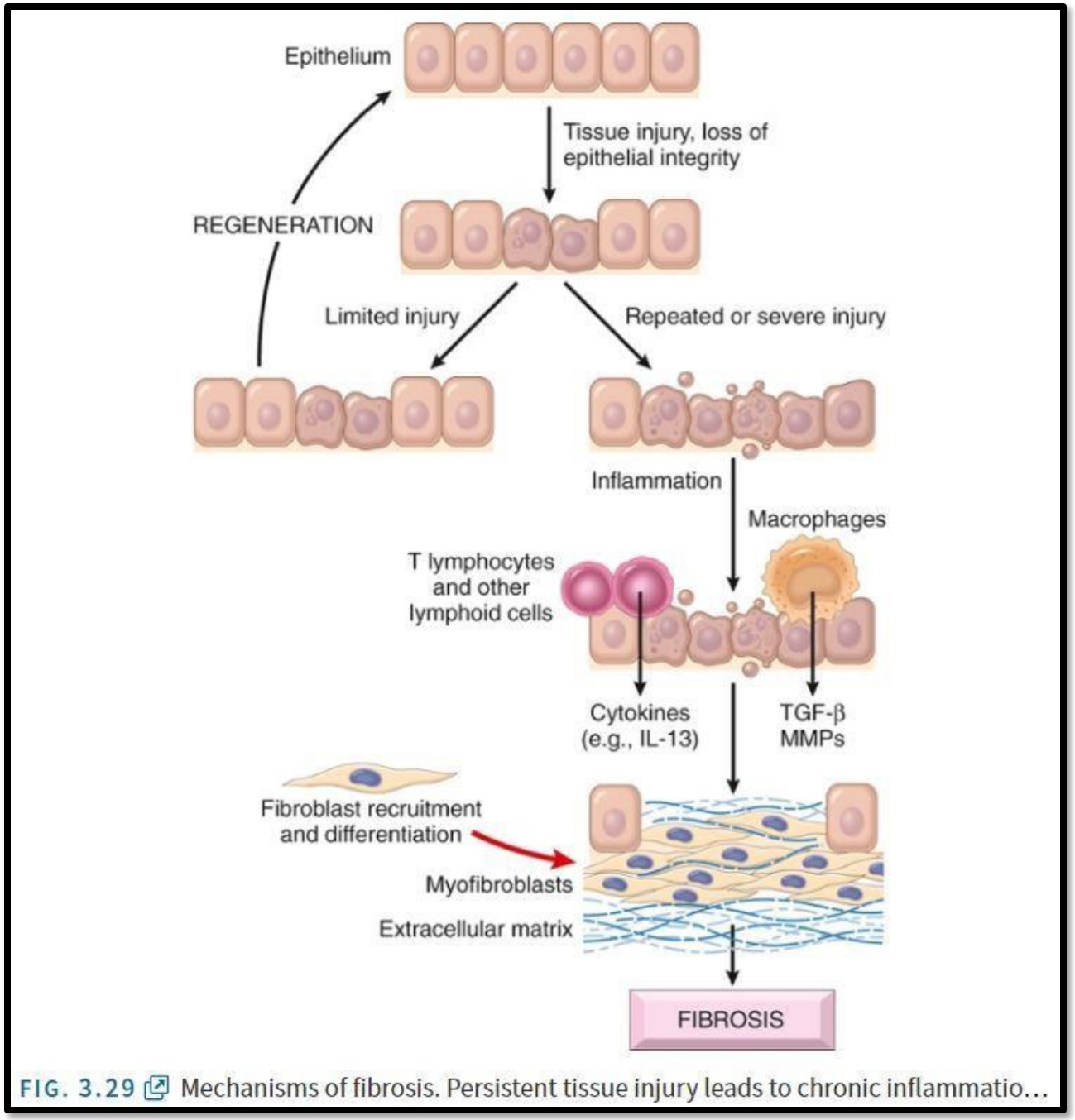


FIG. 3.29 Mechanisms of fibrosis. Persistent tissue injury leads to chronic inflammatio…

- **The following picture represents 2 cases of response to tissue injury. On the right there is a continuous (inflammatory response then fibrosis). Happens more often in chronic active diseases.**

Summary

Cutaneous Wound Healing and Pathologic Aspects of Repair

- The main phases of cutaneous wound healing are inflammation, formation of granulation tissue, and ECM remodeling.
- Cutaneous wounds can heal by primary union (first intention) or secondary union (secondary intention); secondary healing involves more extensive scarring and wound contraction.
- Wound healing can be altered by many conditions, particularly infection and diabetes; the type, volume, and location of the injury are important factors that influence the healing process.
- Excessive production of ECM can cause keloids in the skin.
- Persistent stimulation of collagen synthesis in chronic inflammatory diseases leads to tissue fibrosis, often with extensive loss of the tissue and functional impairment.

For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1		تم إعادة صياغ هذا الملف يرجى الإعتماد على هذه النسخه	
V1 → V2			

Additional Resources:

رسالة من الفريق العلمي:

Through these videos, you can see real clinical cases of ulcers:

1. Diabetic foot ulcer : click here
2. Arterial ulcers : click here
3. Venous leg ulcers : click here

وإذا كانتِ النفوسُ كبارًا
تعبت في مرادها الأجسامُ