

بِناَمِ خدا

بیوپسی

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متخصص پاتولوژی دهان و فک و صورت
PhD در پزشکی مولکولی

Biopsy

A biopsy is a medical procedure that involves taking [a small sample of tissue](#) so that it can be examined under a microscope

The term “biopsy” is a combination of two Greek words of “bios” meaning “life” and “opsis” meaning “vision”

A doctor should recommend a biopsy when an initial test suggests an area of tissue in the body isn't normal

The suspicious area may be noticed during a [physical examination](#) or internally [on an imaging test](#)

For diagnosis of

- cancer
- gastrointestinal problems
- hepatitis
- kidney disease
- specific infections
- And etc.

Different Techniques of Biopsy

Needle biopsy. Most biopsies are needle biopsies, meaning a **needle** is used to access the suspicious tissue. Are used for any tissue that is easily accessible under the skin such as **thyroid, lymph nodes by aspiration**. This simple procedure is also called **fine-needle aspiration**. A long, thin needle is inserted into the suspicious area to draw out fluid and cells for analysis.

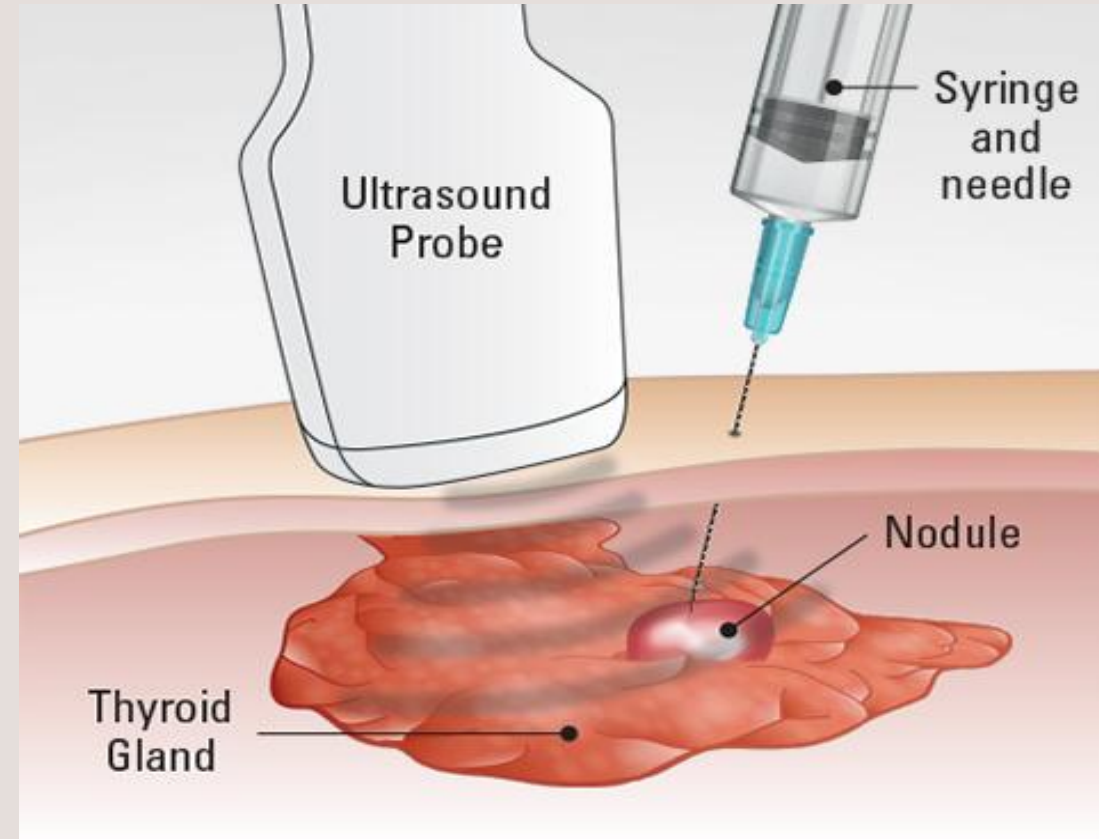
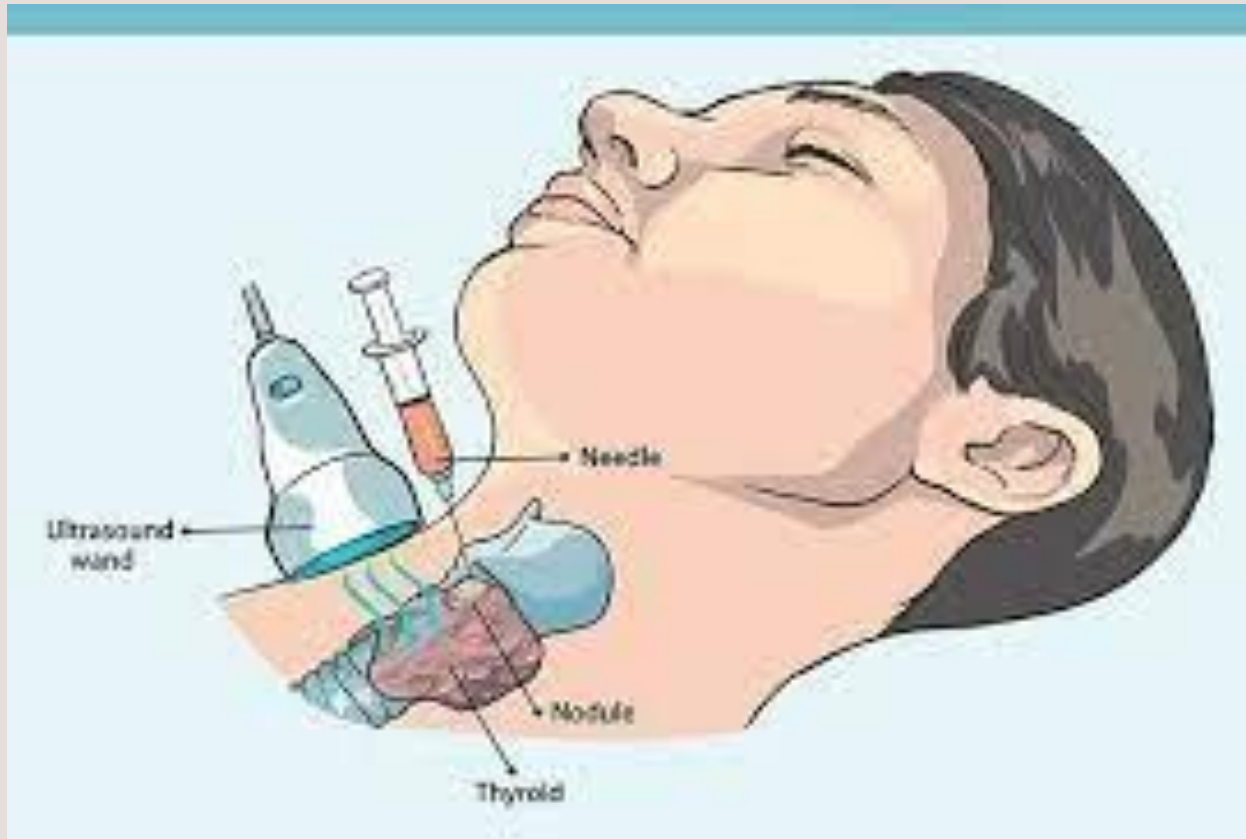
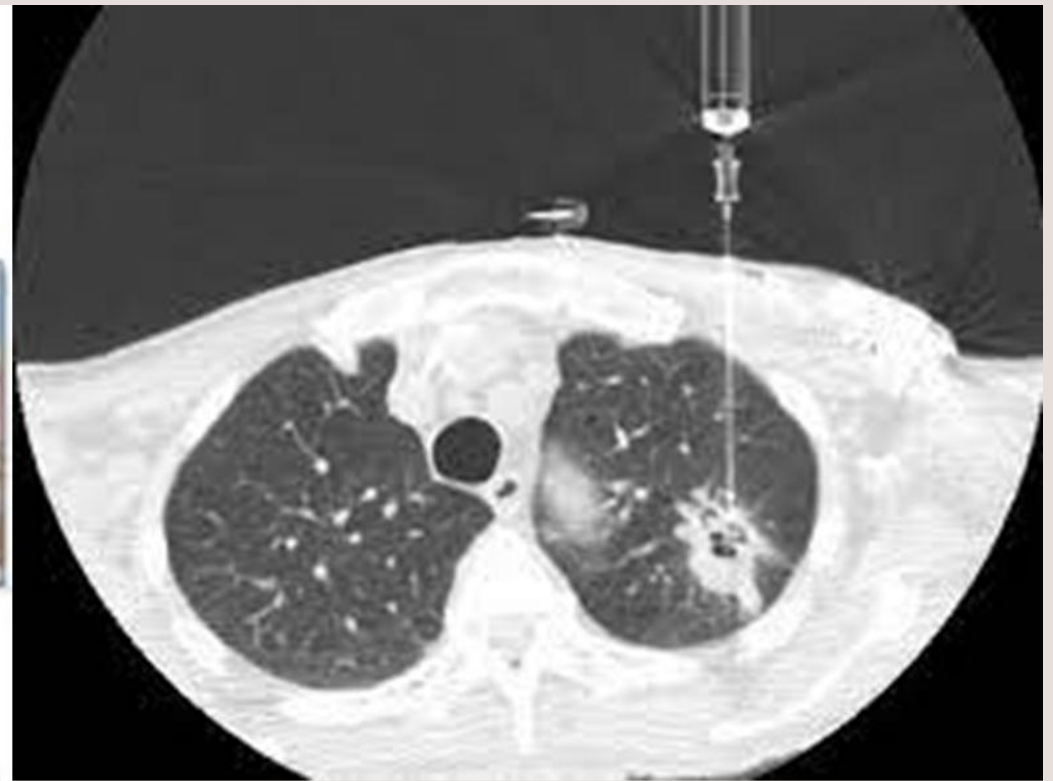
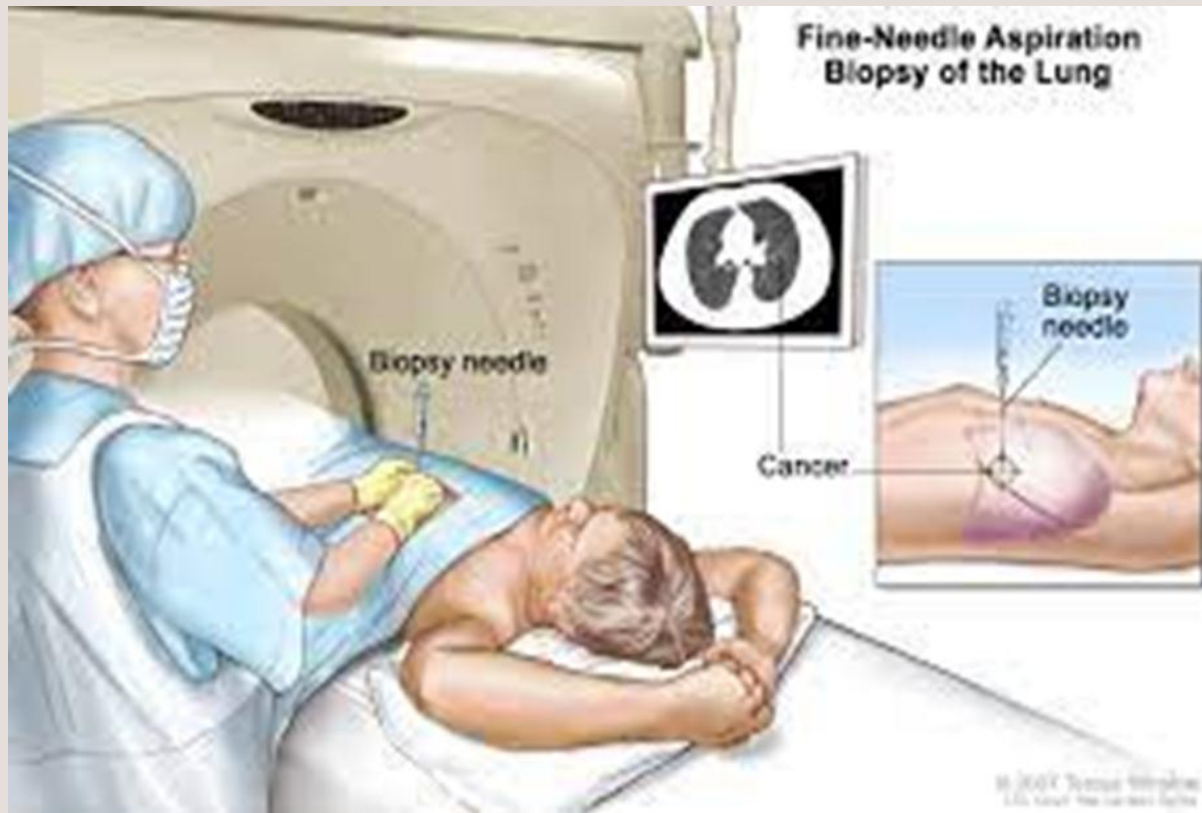




Image-guided biopsy. Image-guided biopsy combines an imaging procedure such as

- 1- **X-ray**
- 2- computerized tomography (**CT**)
- 3- magnetic resonance imaging (**MRI**)
- 4- **ultrasound** with a needle biopsy

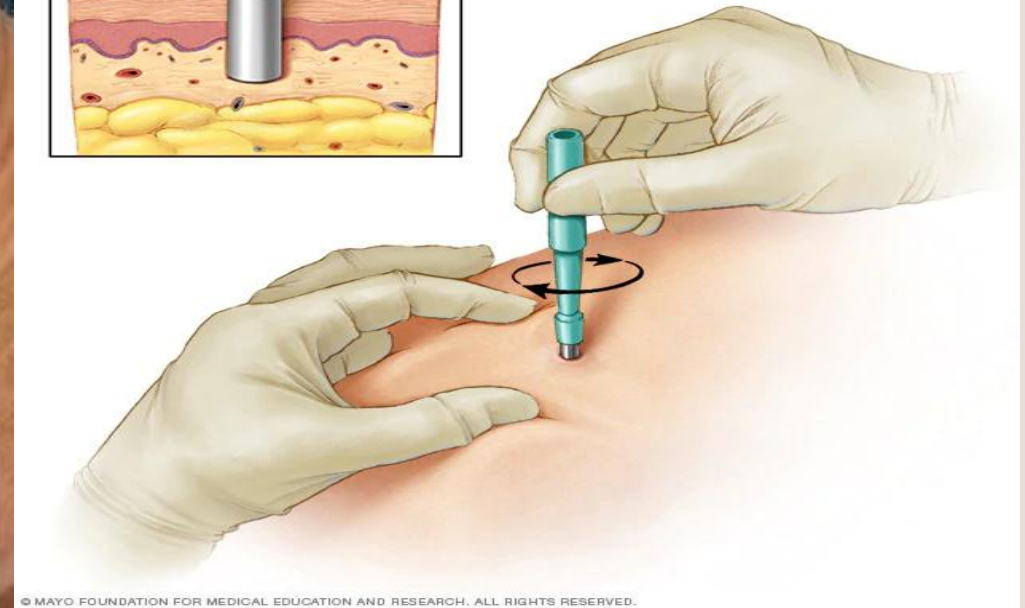
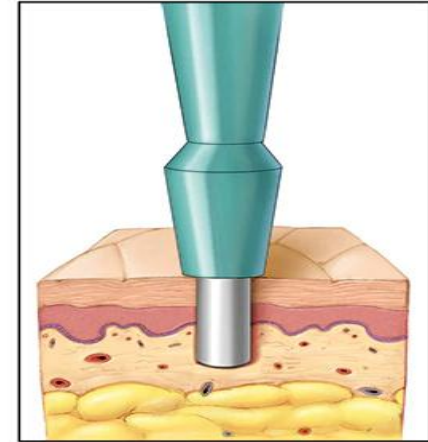
CT-guided biopsy. This is a procedure performed by a radiologist to obtain a small tissue sample through a needle. CT scan is used to guide the needle into the lesion in the safest possible manner. This is a minimally invasive procedure and is an alternative to an open surgical biopsy.



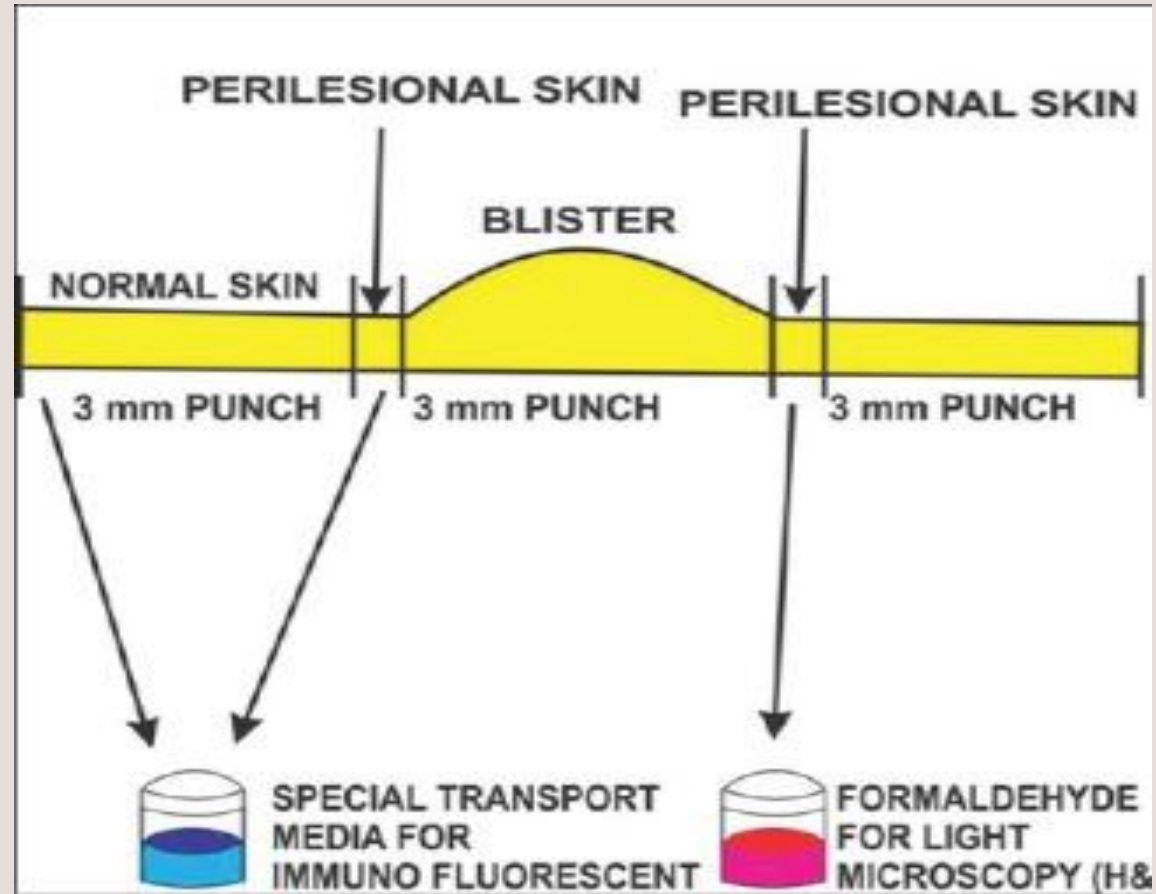
Ultrasound-guided biopsy. An ultrasound scanner helps a doctor direct the needle into the lesion.



Punch biopsy. During a punch biopsy, the doctor uses a circular tool to remove a small section of skin's deeper layers.



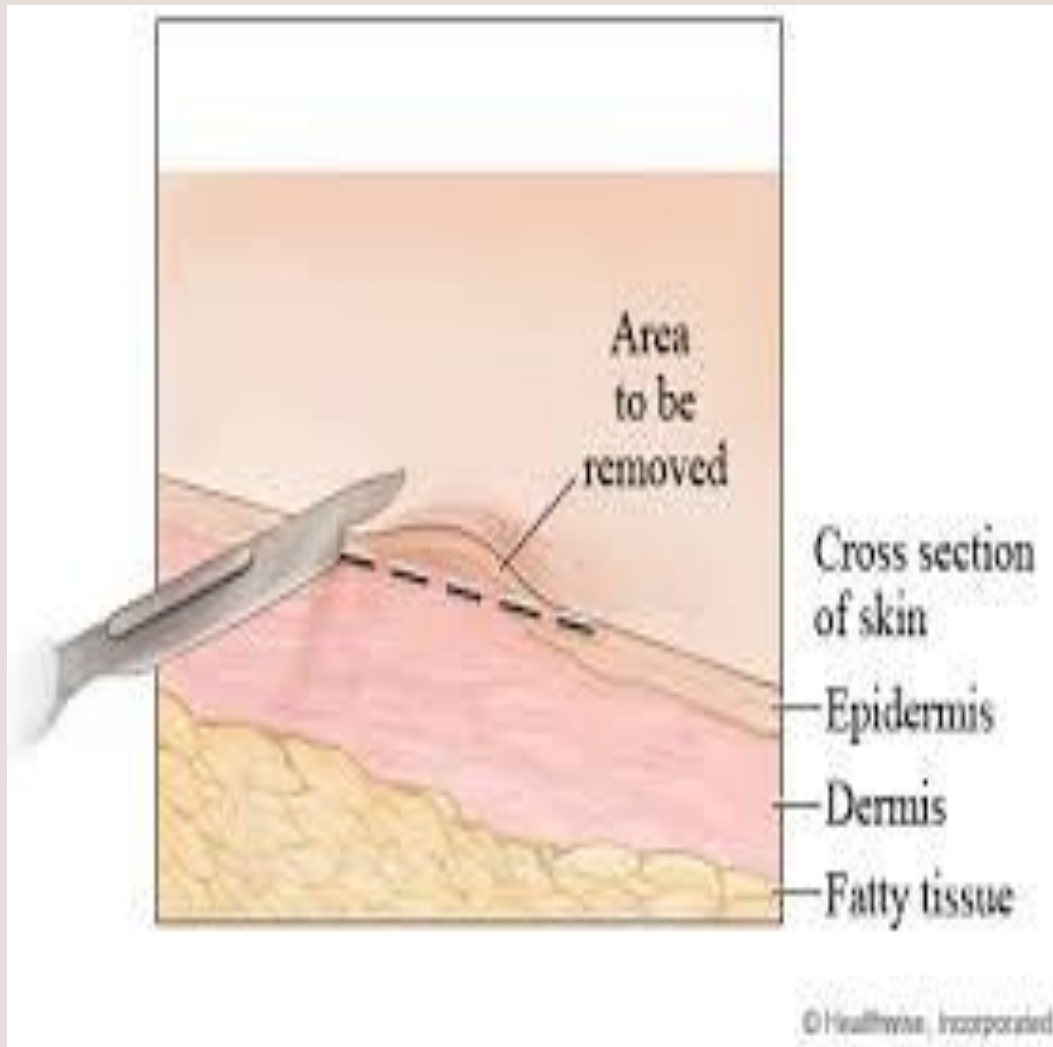
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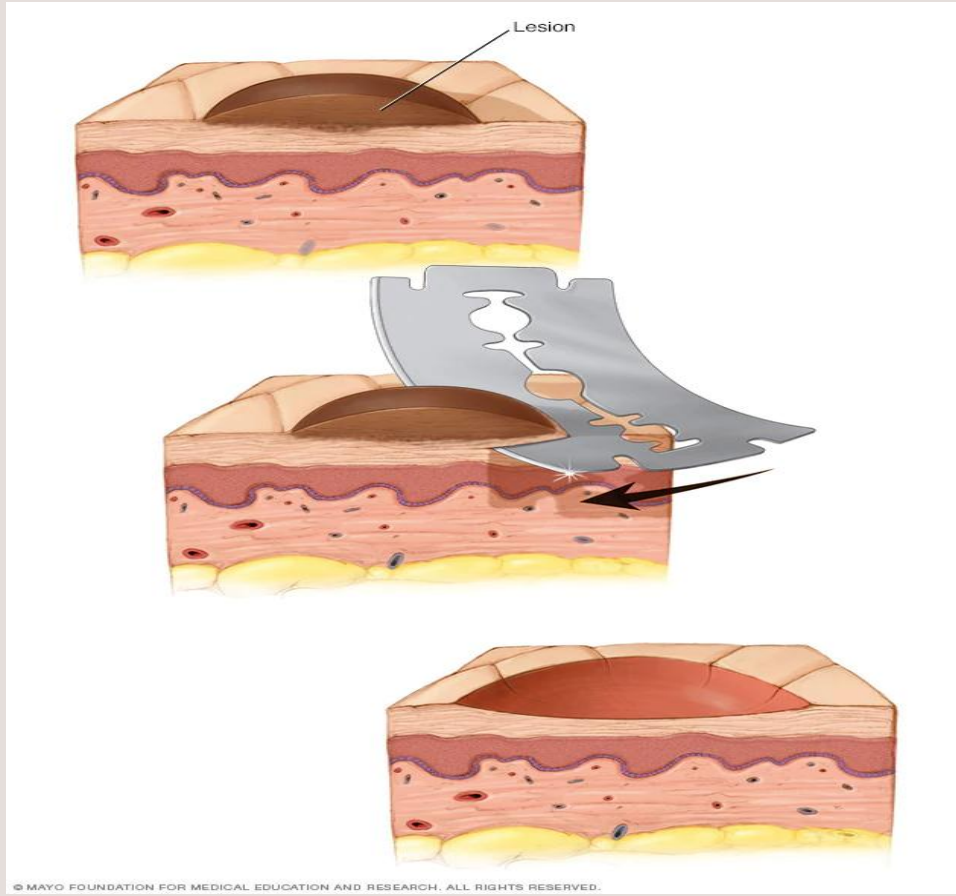
Michel's medium for direct immunofluorescence (DIF) studies

When the tissue specimen reaches the laboratory in Michel's medium, it is washed in phosphate buffered saline (PBS) so as to remove ammonium salts or any residual blood proteins

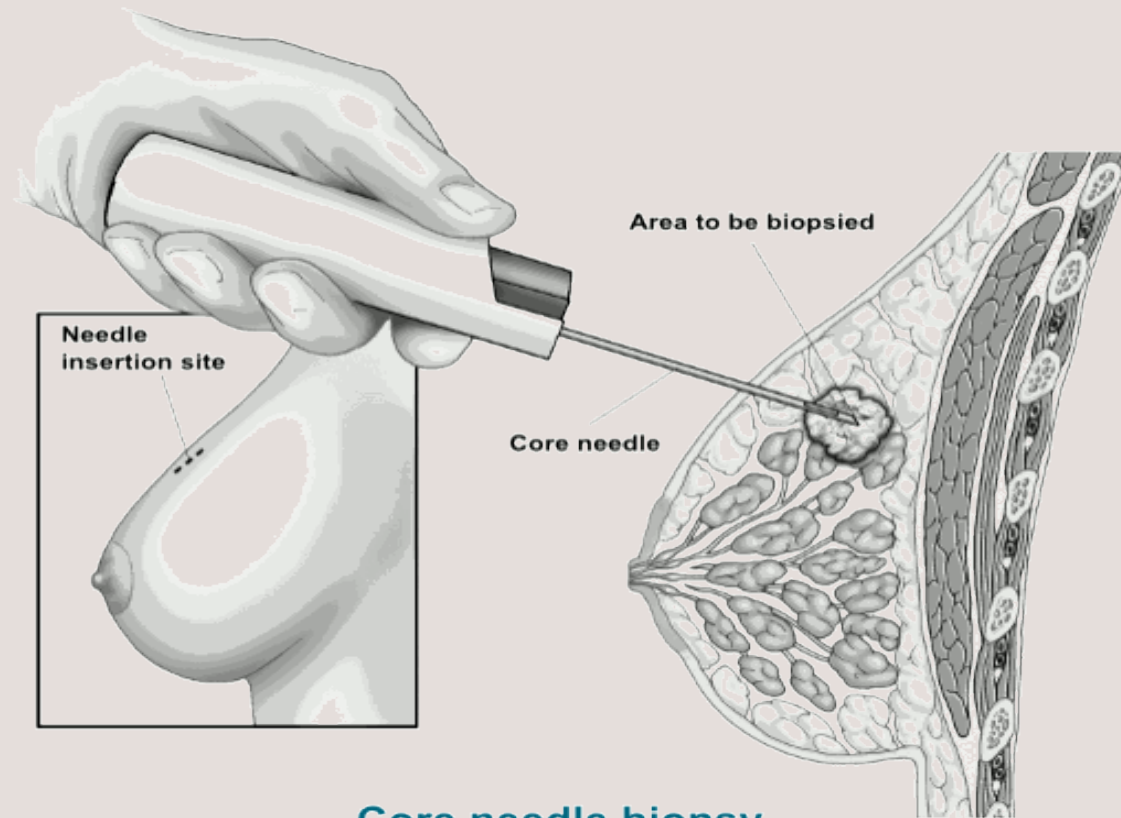
Scalpel biopsy (surgical blade). For Skin and Oral Cavity



Shave biopsy. During a shave biopsy, the doctor uses a tool similar to **a razor** to scrape the surface of skin.



Core needle biopsy. A larger needle with a cutting tip is used during core needle biopsy to draw a column of tissue out of a suspicious area

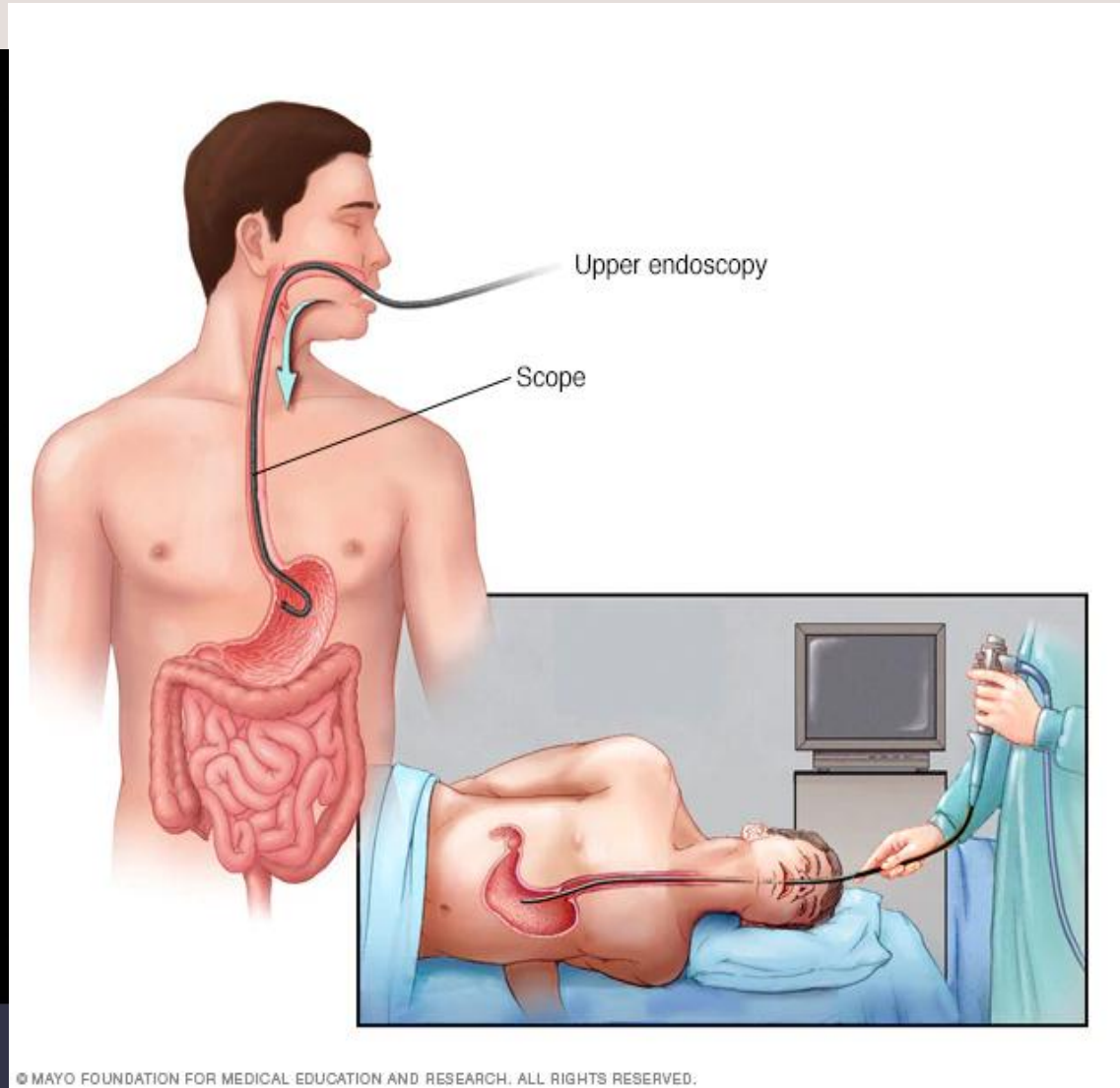


Core needle biopsy

Vacuum-assisted biopsy. During vacuum-assisted biopsy, a suction device increases the amount of fluid and cells that is extracted through the needle. A special needle attached to a vacuum device to take samples of **breast tissue** for examination. This can reduce the number of times the needle must be inserted to collect an adequate sample.



Endoscopic biopsy: from tissues inside the body such as bladder, colon or stomach.



Surgical biopsy. Either open or laparoscopic surgery from tissues that are not easy to reach such as abdomen, from a lump or mass



Exfoliative cytology. Cells shed from body surfaces, such as the inside of the mouth, are collected and examined

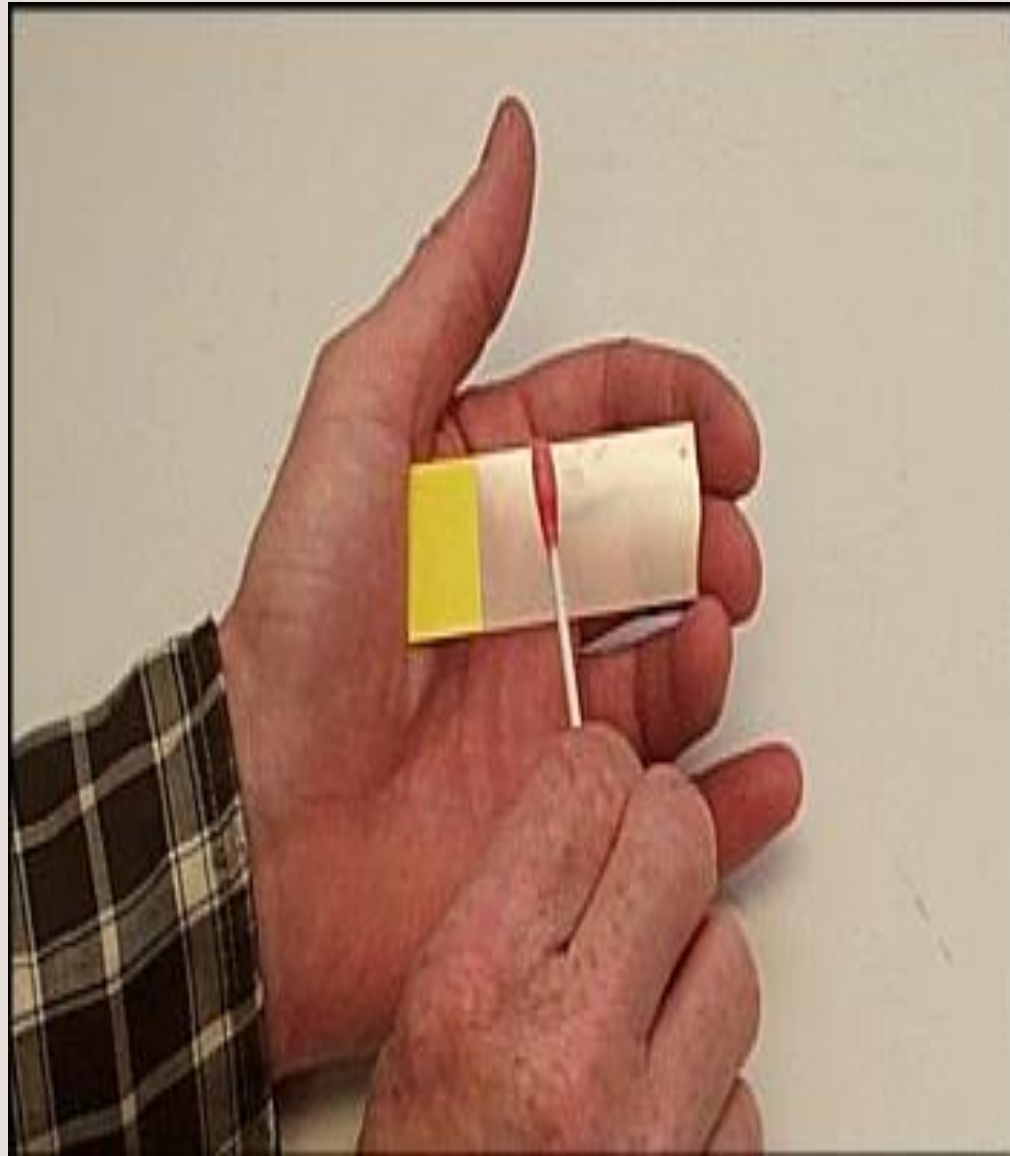
This technique is useful only for the examination of surface cells and often requires additional cytological analysis to confirm the results

It is done by scraping some cells from the suspicious lesion and put them on a slide using sterile swap or brush

This can be done in a doctor's office

Indications:

- 1- Cervical lesions
- 2- Oral lesions
- 3- Urinary tract lesions
- 4- Sputum and Nasal discharge



Indication

- multiple or large red lesions
- Lesion located in region that presents surgical difficulty
- Patient with anticoagulant drug n bleeding disorder
- Older people who can not tolerate surgical procedure
- When herpes or candida suspected
- Follow up for detection of recurrent cancer

Brush biopsy. A brush biopsy is a **noninvasive** procedure

Doctor will gather tissue by forcefully rubbing a brush against the abnormal area of gum

A brush biopsy is often **doctor's first step** if *symptoms don't call for an immediate, more invasive biopsy*

It's used for an initial evaluation



Brush biopsy based on cytology

Indications for a brush biopsy include small or tiny, nonsuspicious, common, unexplained red or white spots



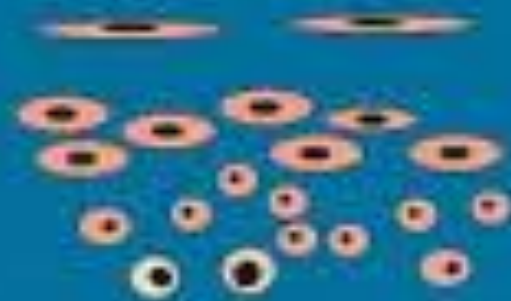
BRUSH BIOPSY

Complete Transepithelial Sample



Superficial
|
Intermediate
|
Basal

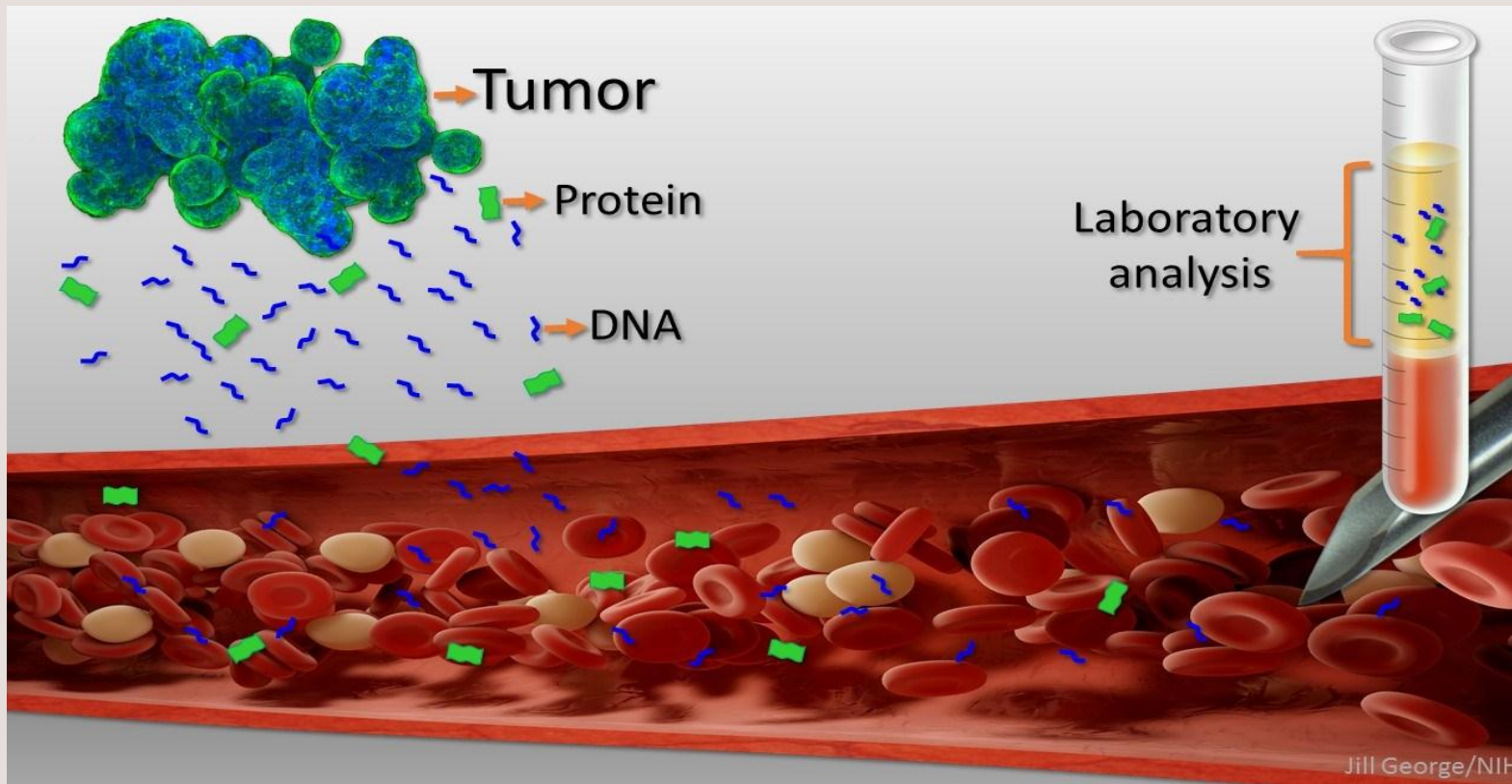
Specimen



Liquid biopsy: A test done on a sample of blood to look for cancer cells from a tumor that are **circulating** in the blood or for pieces of DNA from tumor cells that are in the blood

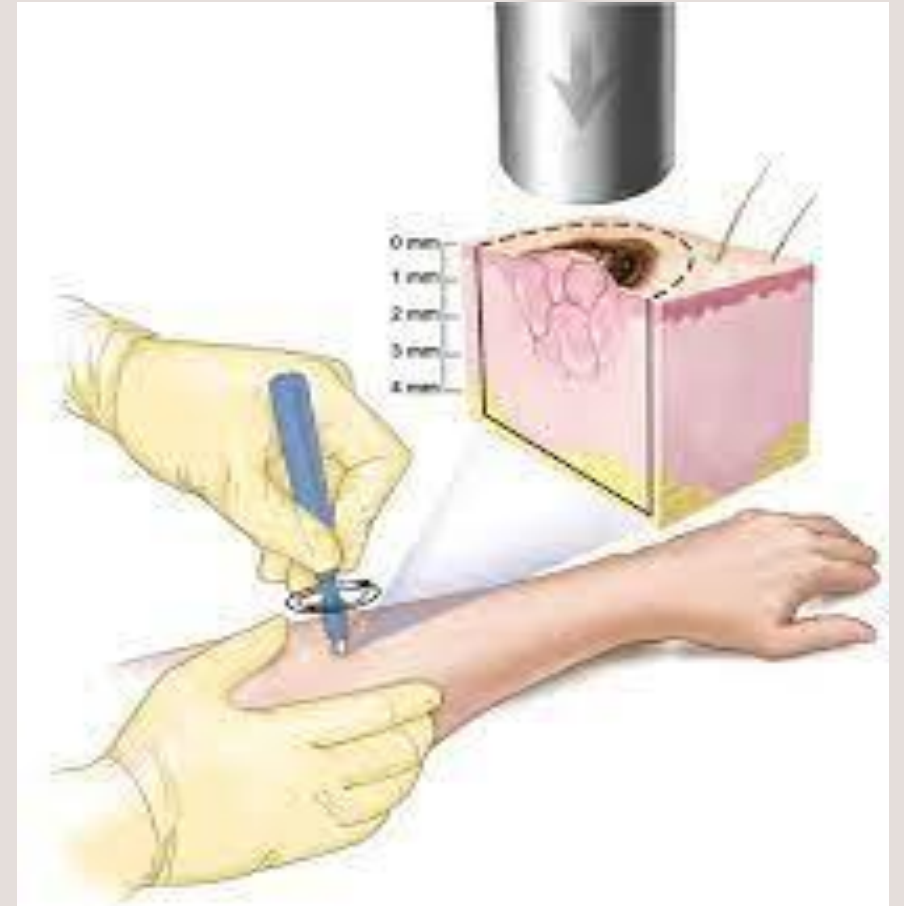
A liquid biopsy may be used to help **find cancer at an early stage**

It may also be used to help **plan treatment** or to find out **how well treatment** is working or the **recurrence of a cancer**

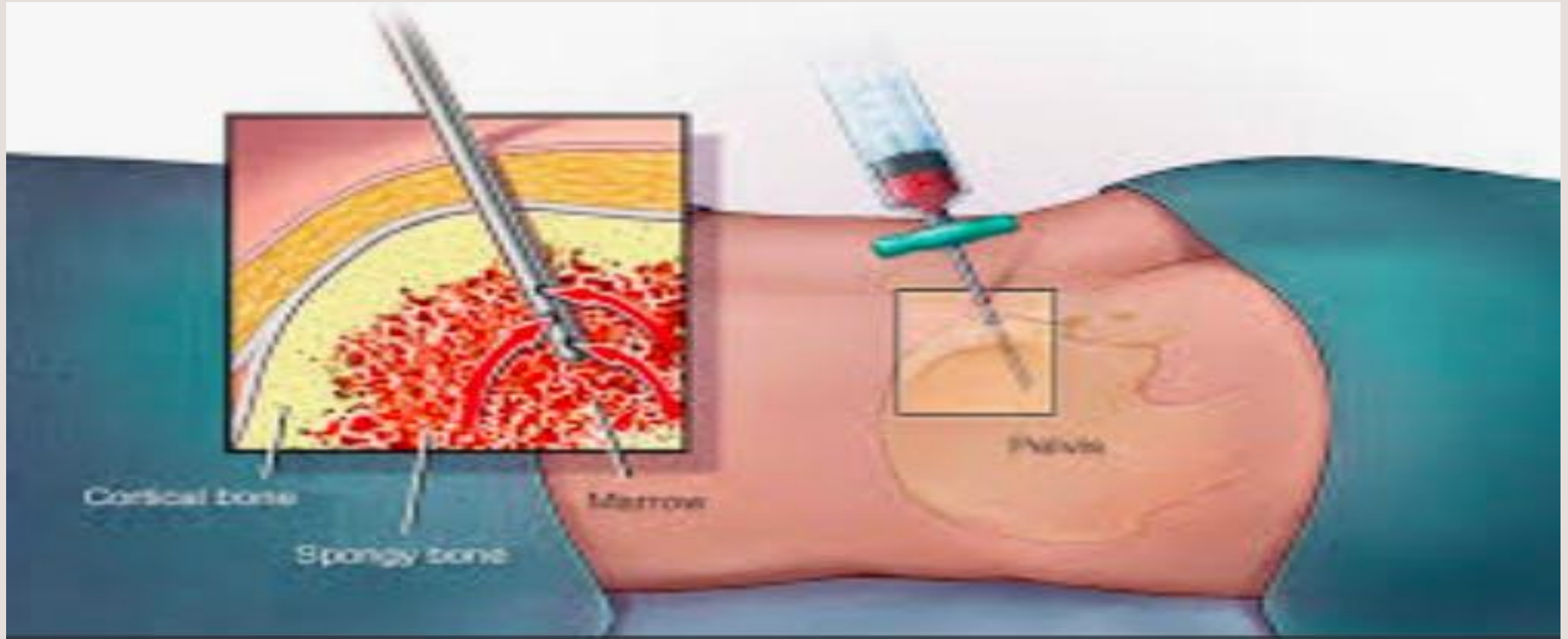


Biopsy from different organs and tissues

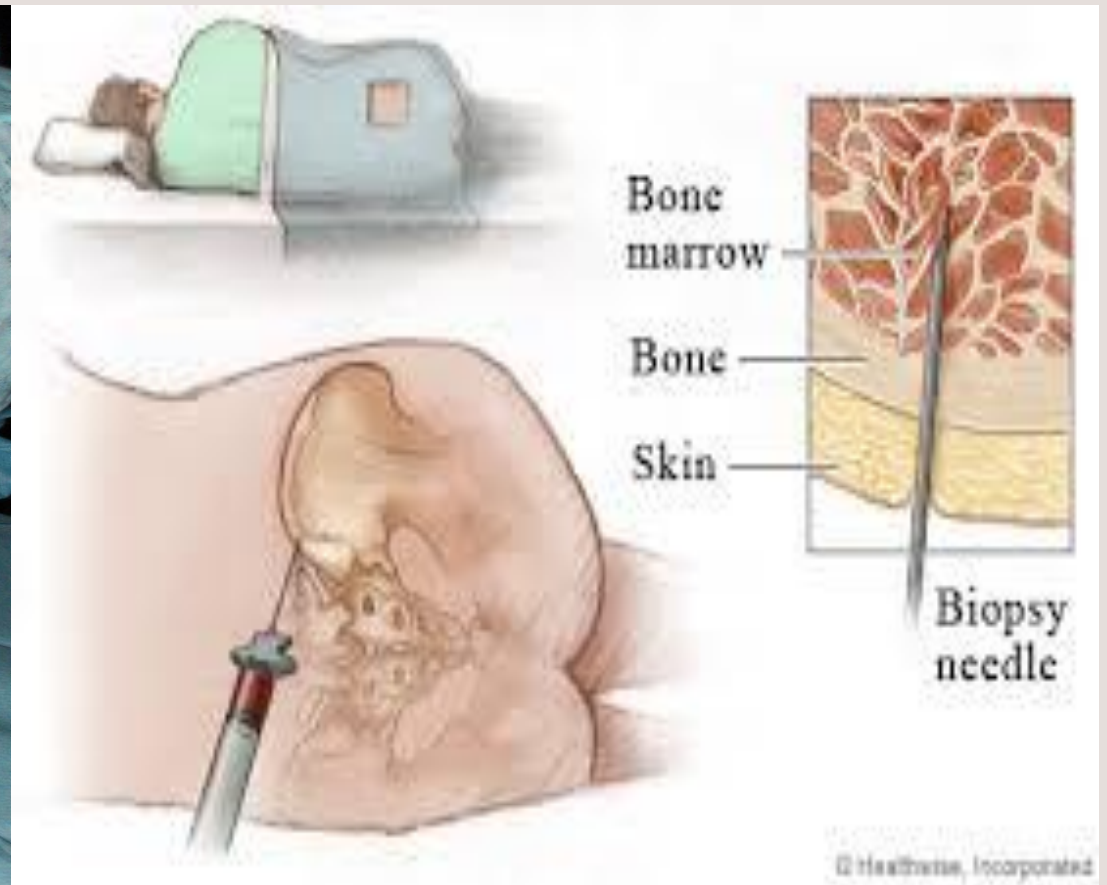
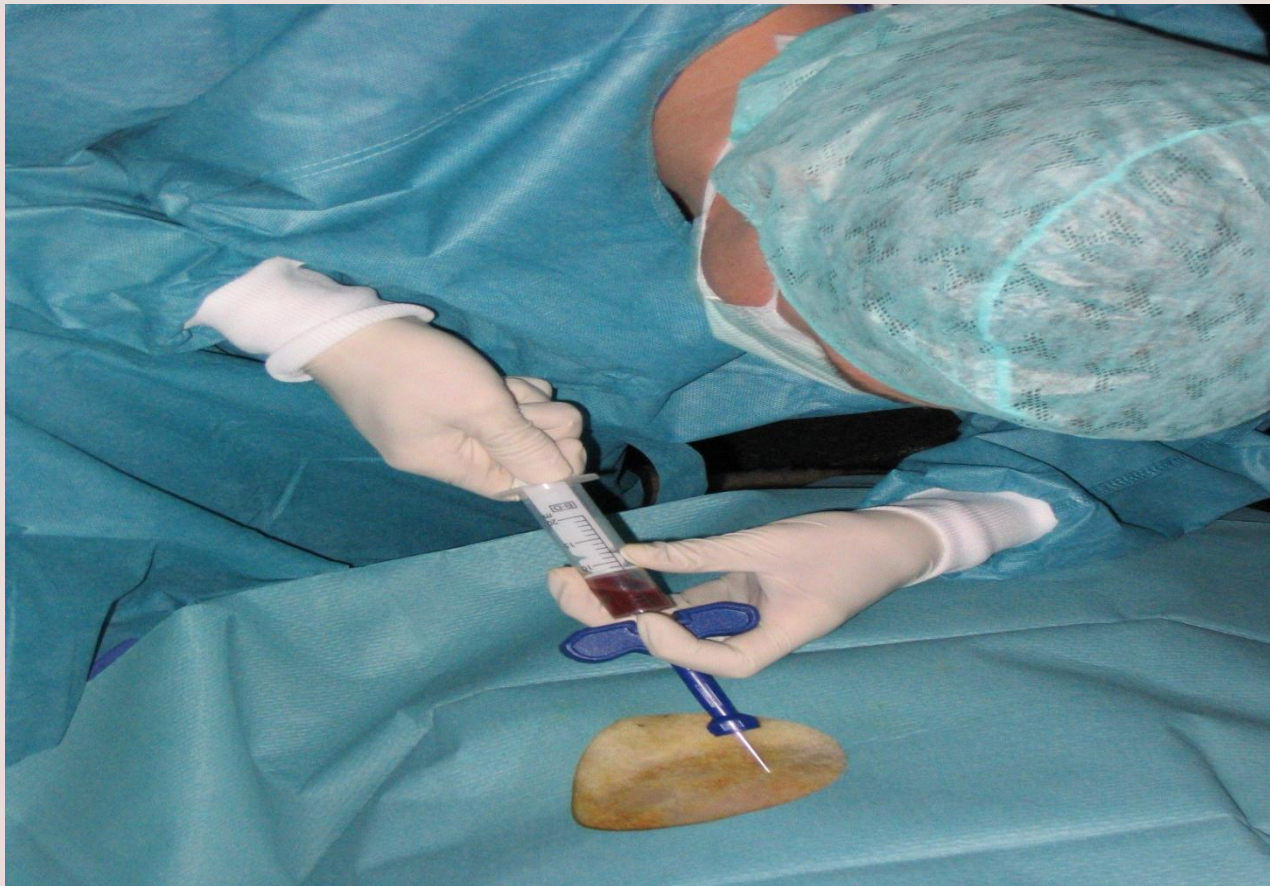
Skin biopsy. A **punch biopsy** is the main biopsy method
It uses a circular blade to get a cylindrical sample of skin tissue.



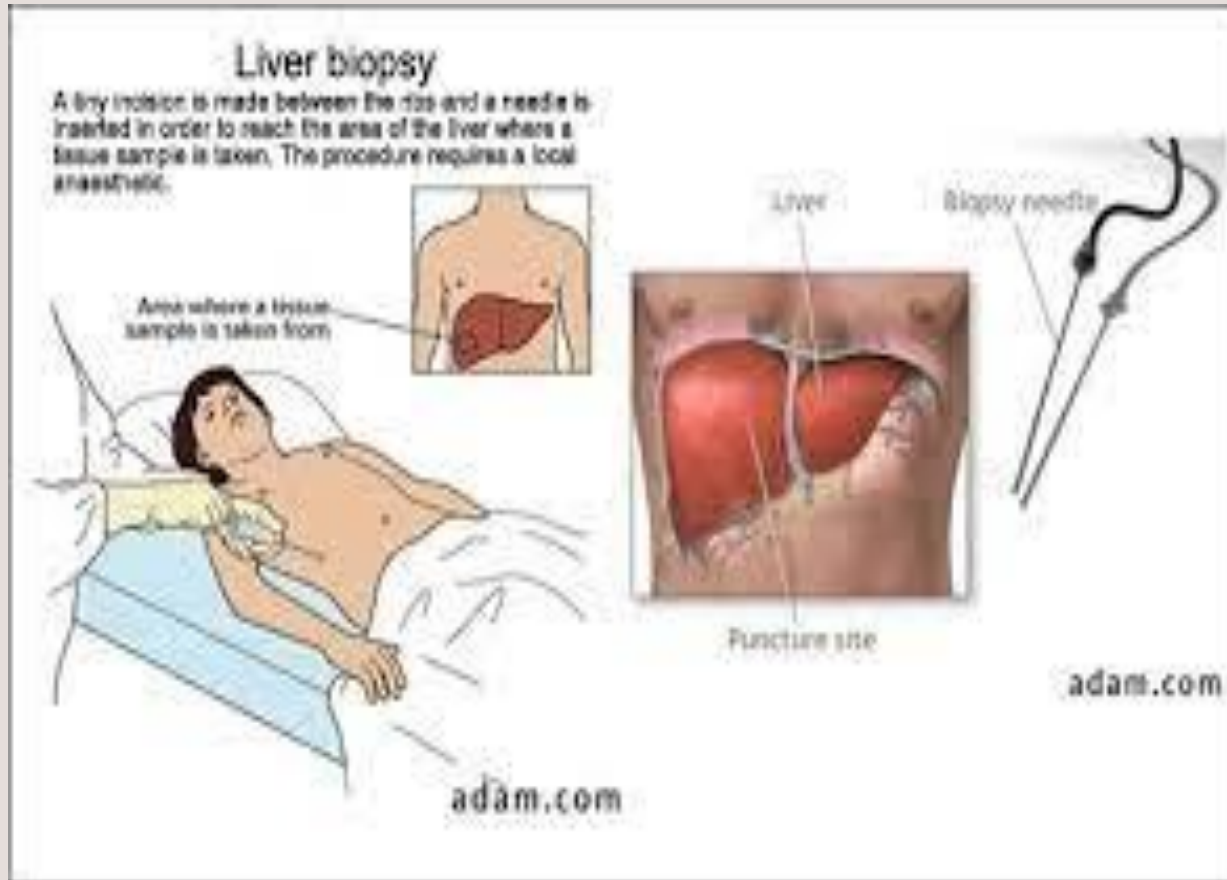
Bone biopsy. A bone biopsy is used to look for [cancer](#) of the bones. This may be performed via the **CT scan technique** or by **an orthopedic surgeon**.



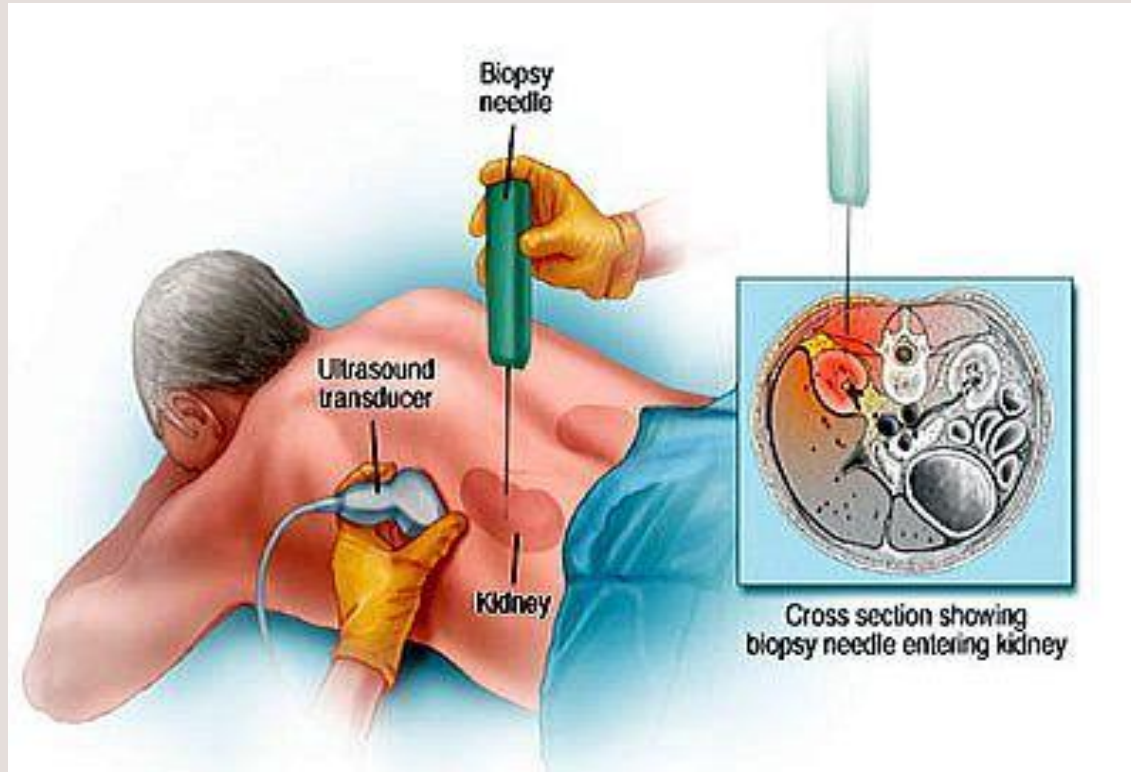
Bone marrow biopsy. A large needle is used to enter the pelvis bone to collect bone marrow. This detects blood diseases such as leukemia or lymphoma.



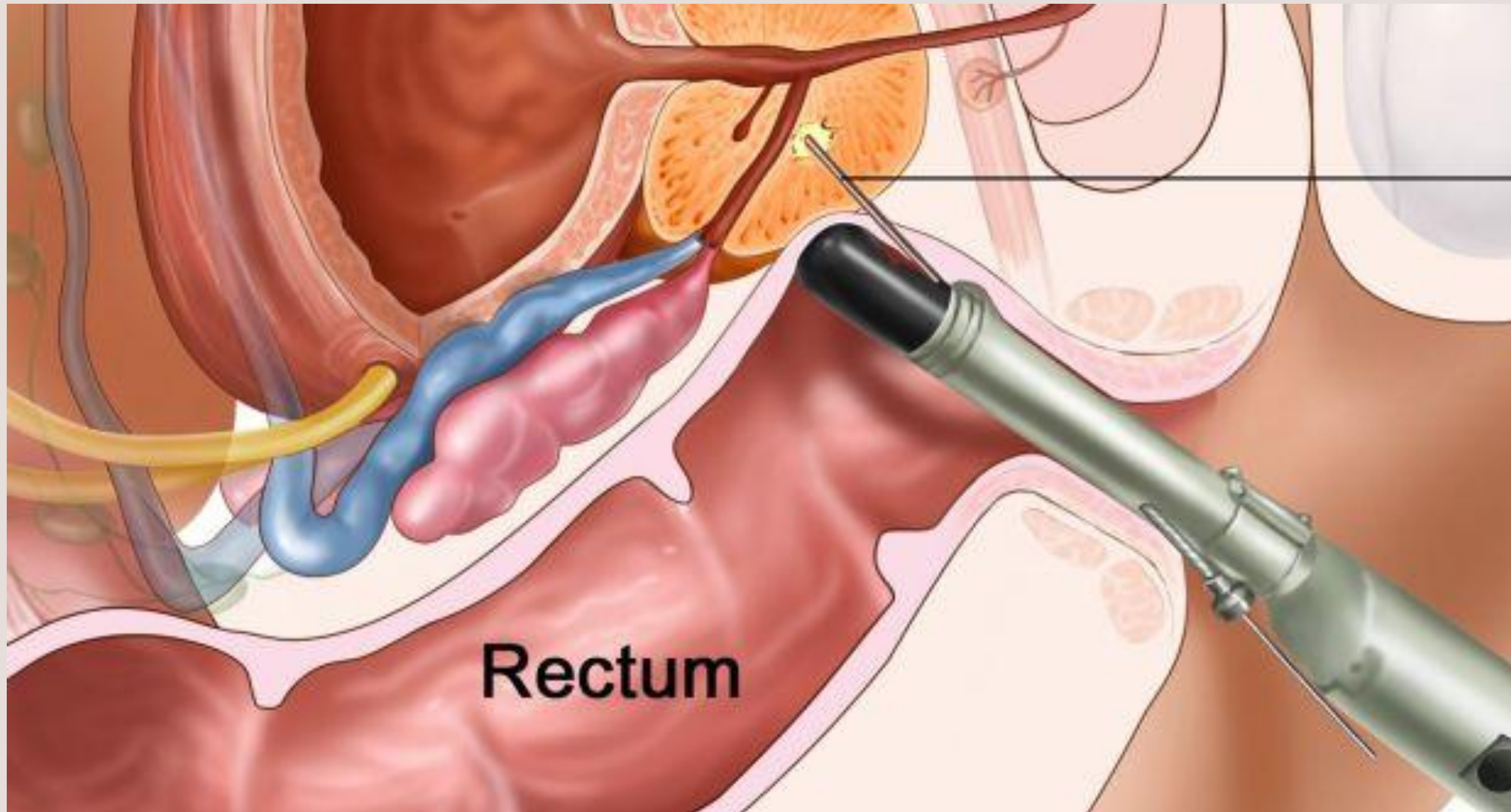
Liver biopsy. A **needle** is injected into the liver through the skin on the belly, capturing liver tissue.



Kidney biopsy. Similar to a liver biopsy, a **needle** is injected through the skin on the back, into the kidney.



Prostate biopsy. Multiple **needle** biopsies are taken at one time from the prostate gland.



Types of Biopsies

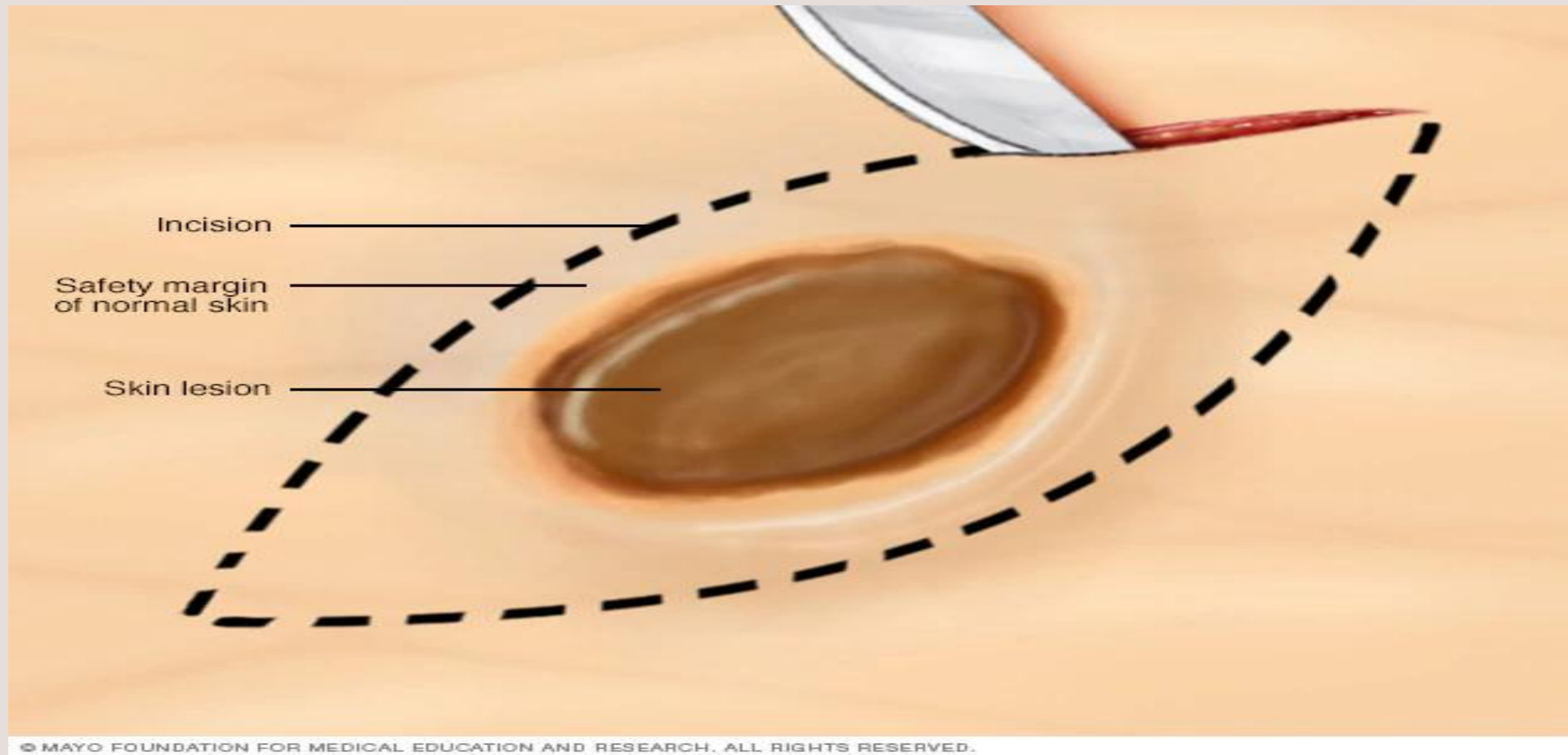
- Generally, biopsy is divided into two types:
- **An excisional biopsy** – where surgery is used to remove whole lesion
- **An incisional biopsy** - where surgery is used to remove a small piece of tissue

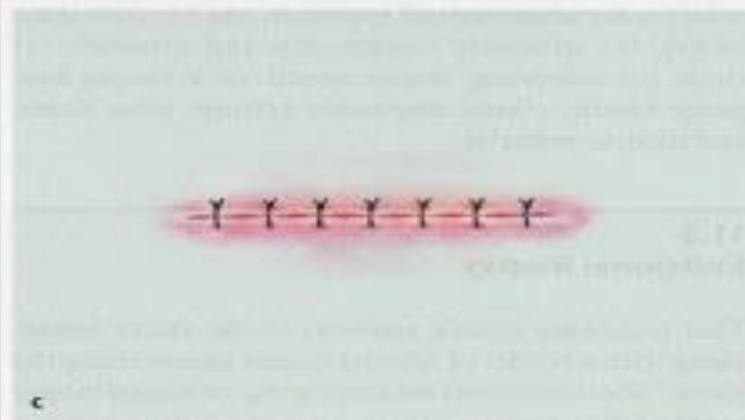
Excisional Biopsy

Indications:

- Should be employed with small lesions. Less than 1cm
- The lesion on clinical exam appears benign.
- When complete excision with a margin of normal tissue is possible without mutilation.

An excisional biopsy





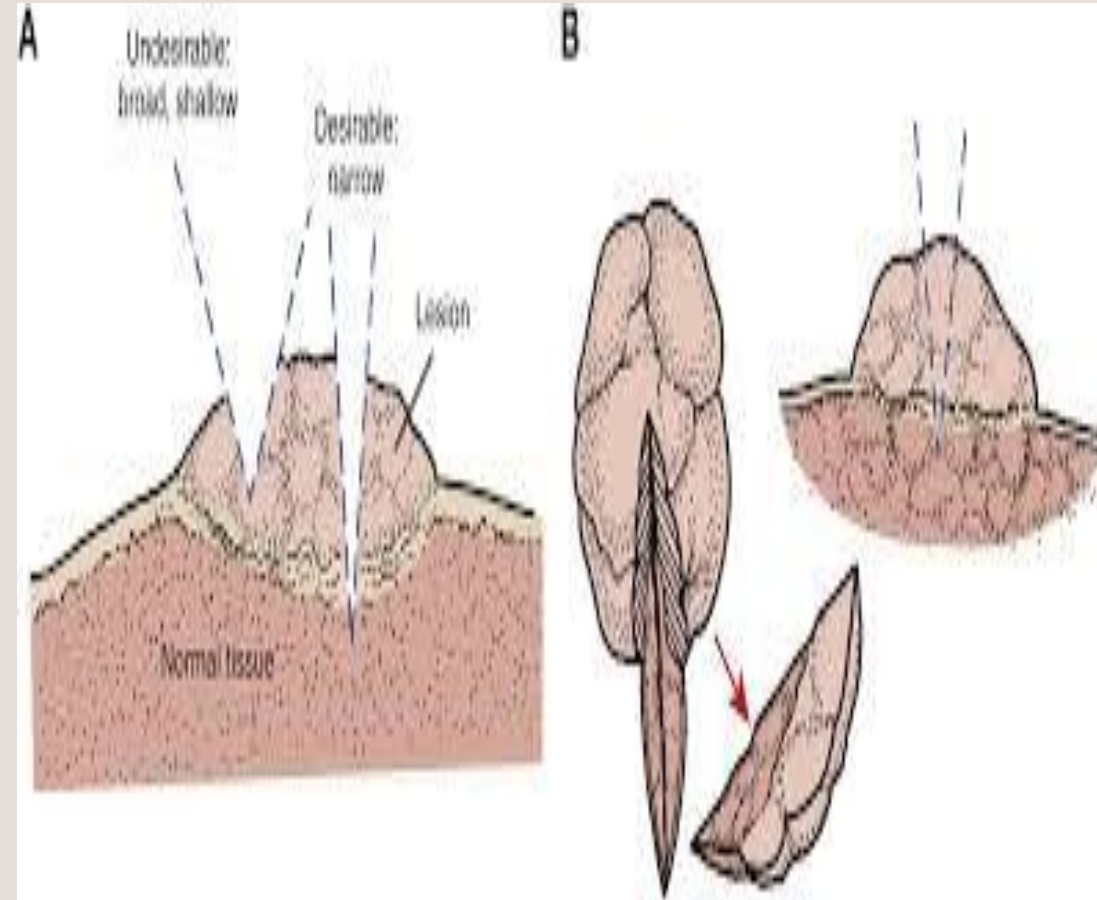
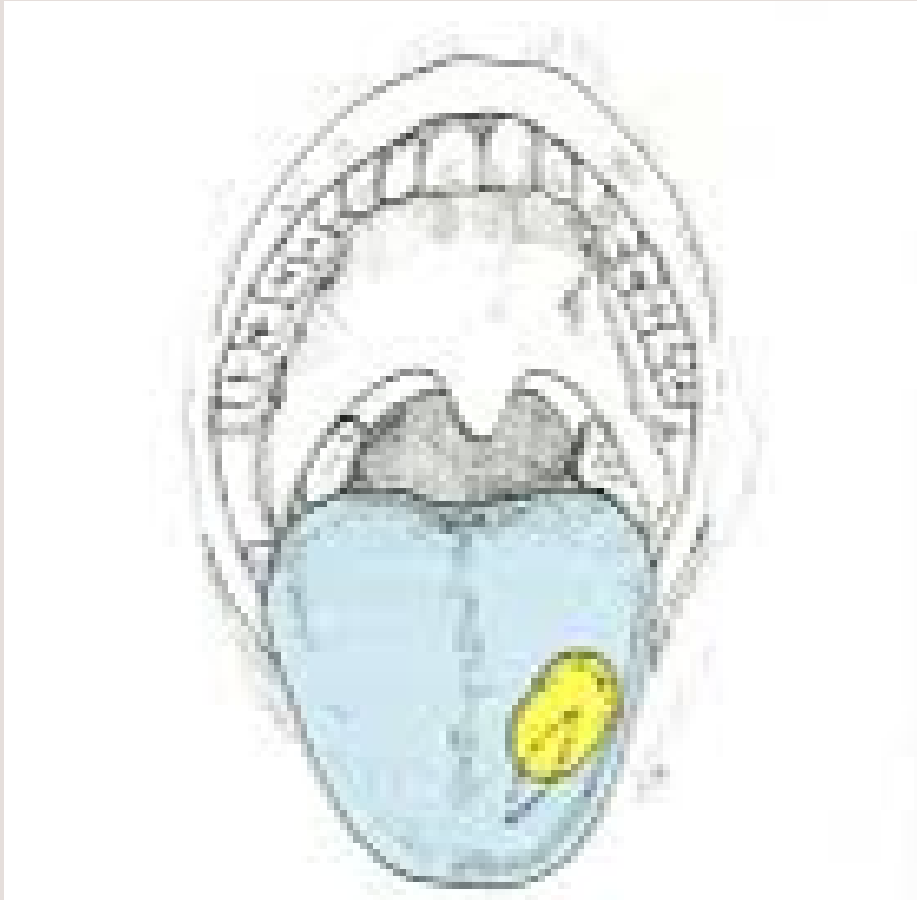


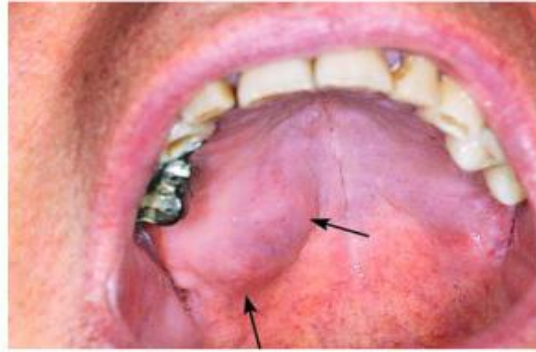
Indications of Incisional Biopsy

Incisional biopsy is used for lesions **suspected of malignancy or in precancerous lesions** such as squamous cell carcinoma, leukoplakia, erythroplakia

It is also used for chronic ulcers, lichen planus

An incisional biopsy





1



2



3



4



5



6

Oral biopsies

- 1- Soft tissue biopsy
- 2- Hard tissue (Intraosseous) biopsy

Oral soft tissue biopsy

Indications

Any clinical suspicion of

- 1- malignancy, such as an enlarging mass
- 2- chronic ulceration
- 3- induration on palpation
- 4- persistence of mucosal changes despite removal of local irritants
- 5- new or enlarging pigmented lesions, especially those with an irregular border and nonhomogenous coloration
- 6- lichen planus
- 7- mucous membrane pemphigoid
- 8- pemphigus vulgaris and other immune-mediated disorders may present with widespread mucosal erythema and ulceration

What are the risks?

- 1- **bleeding** at the biopsy site
- 2- **soreness or pain** that lasts longer than a few days
- 3- **swelling**
- 4- **infection**, fever or chills

Note: Complications are **rare**

Techniques for biopsy of oral soft tissue

Excisional or incisional biopsy

- 1- Exfoliative biopsy, Brush biopsy
- 2- Punch biopsy
- 3- Scalpel biopsy

Brush biopsy and advantages

A major advantage of the oral brush biopsy are:

- 1- it requires **no** topical or local anesthetic
- 2- causes **minimal or no bleeding or pain**.

The brush biopsy instrument is supplied **sterile** and is designed to obtain **a trans-epithelial biopsy** specimen, capturing cells from **all layers of the epithelium** of the lesion

The brush biopsy samples **the superficial and deep layers of the lesion, down to the basement membrane**

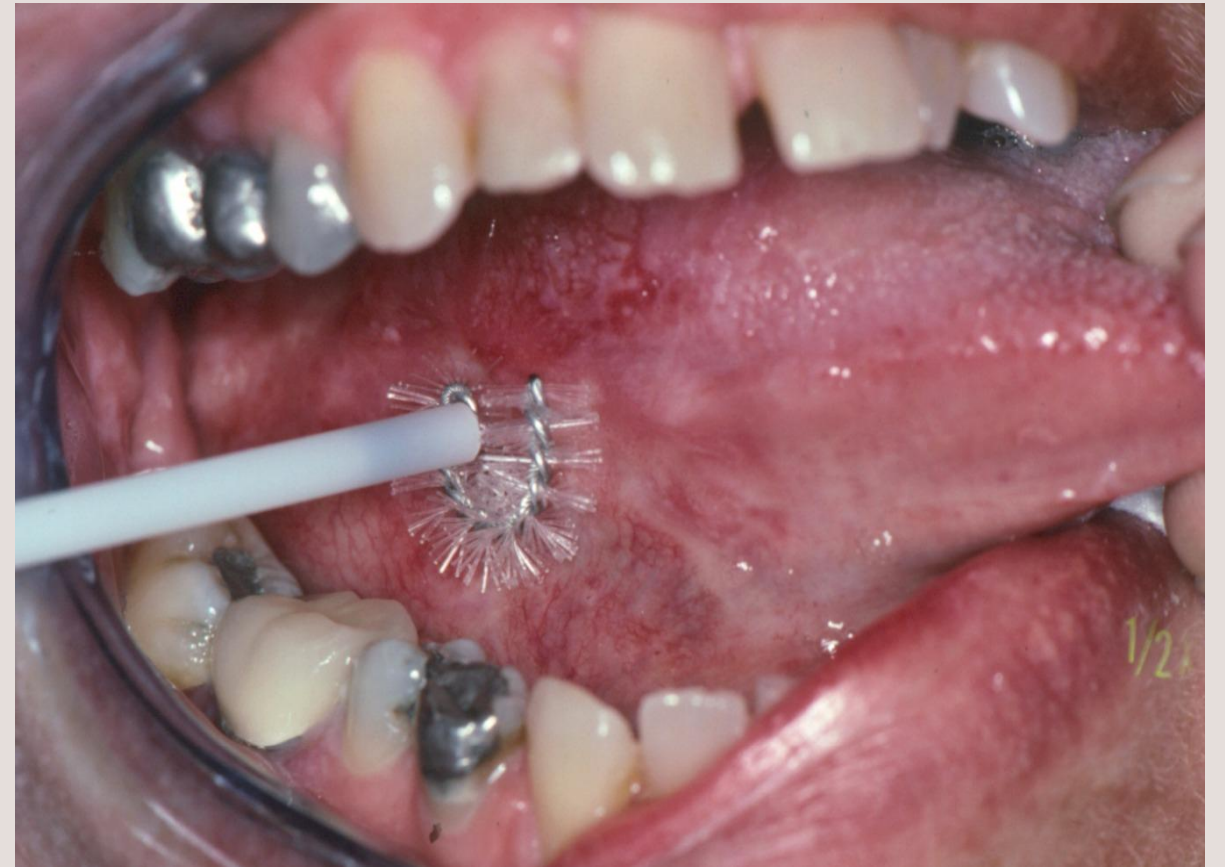
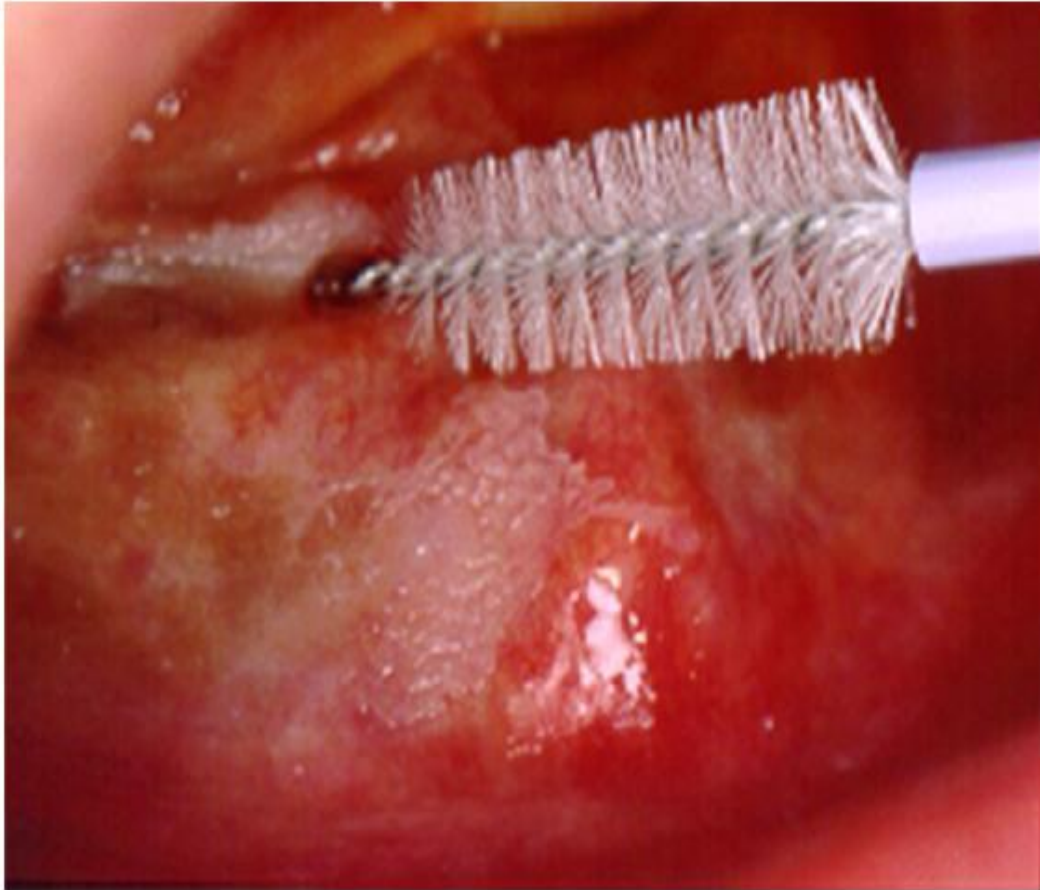
The **deeper layers** of the oral epithelium are often the only layers that contain the pre-cancerous and cancerous cells

It is important to learn that **how much pressure** to apply and how many rotations are required

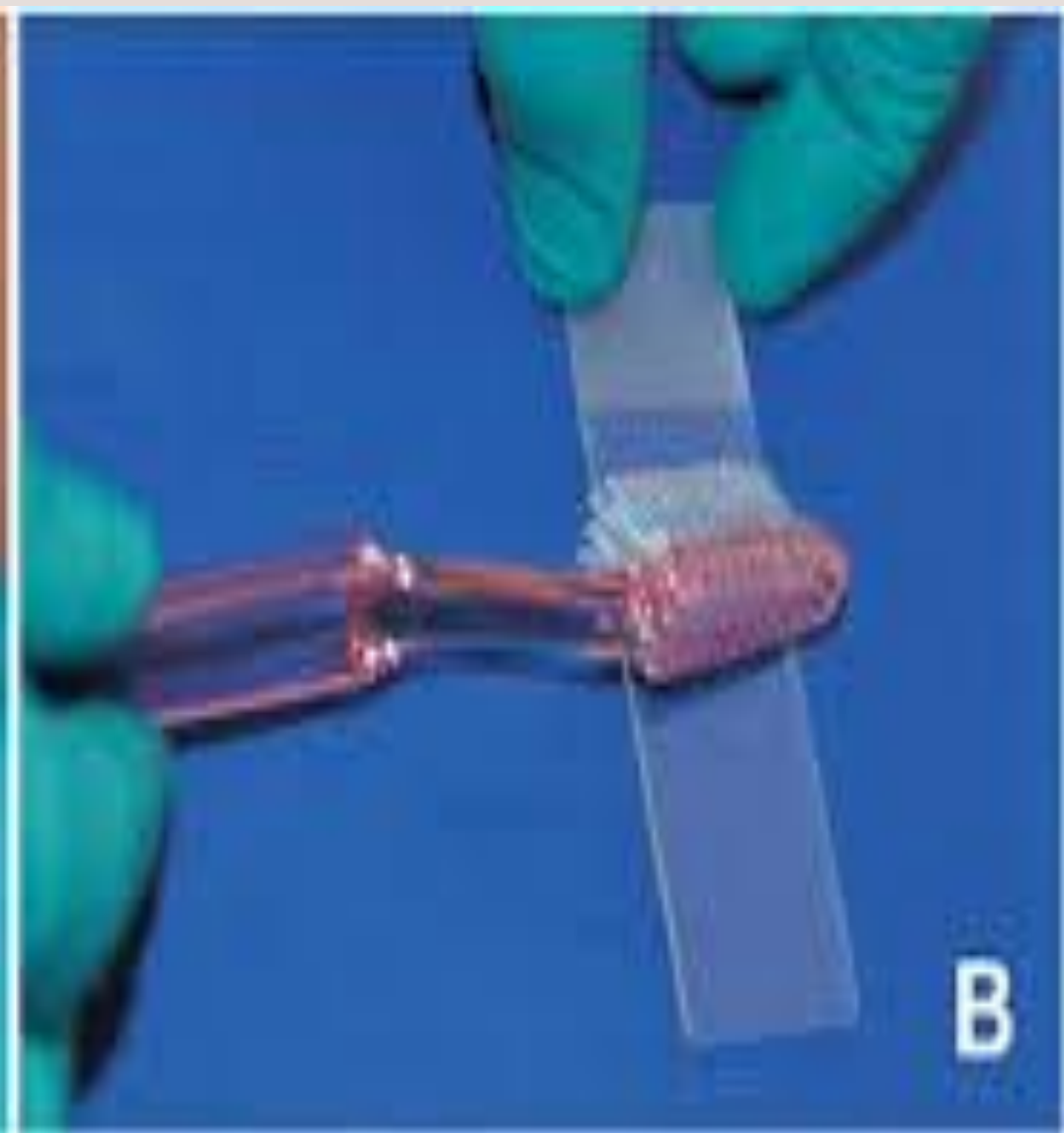
The cutting edge of the brush is placed against the lesion and while maintaining **firm pressure, rotated in a clockwise fashion**

It is crucial that you apply **enough pressure** to achieve a complete biopsy sample, capturing cells from the entire thickness of the epithelium

Brush biopsy in the oral cavity







The brush should be repeatedly rotated in most cases **about 5-15 times**

Red lesions and ulcerations generally require **little pressure** and few rotations while white lesions, which are typically **covered with keratin**, require more pressure and more rotations to reach the basement membrane

Lesions on the **palate and gingiva** also require more rotations and firmer pressure since these sites are **keratinized**

If the mucosa at site of the oral lesion turns pink or red, and if **pinpoint bleeding** is observed, then the brush has penetrated to the basement membrane and a complete trans-epithelial sample has been achieved

Typically, after just the first or second brush biopsy procedure, dentists feel very confident and adept at performing the technique

After obtaining the sample, the cellular material on the brush needs to be transferred to **the glass slide** provided in the kit

The surface of the brush used to sample the lesion should be rotated on the glass slide **from one end to another**

Transfer as **much cellular material** from the brush to the slide by using the same rotating motion on the slide as used in the mouth

A thin film of material representing the biopsy specimen should be observed on the glass slide if it is held up to the light

If this **is not evident**, *obtain additional material from the patient's lesion utilizing the same brush biopsy instrument*

Once the transfer is complete, the glass slide is then flooded with **fixative** that is supplied in individual packets with each kit

The glass slide is **set aside to dry**

Usually after **15 or 20 minutes the sample** is ready

ORAL CDx TECHNIQUE



1 BRUSH

Firmly press biopsy brush against lesion and rotate until pinpoint bleeding is observed.



2 SPREAD

Spread cellular material from brush onto enclosed glass slide.



3 FIX

Immediately empty contents of a complete fixative packet onto slide.



4 SECURE SPECIMEN

Place dry slide in supplied slide holder and snap securely shut.



5 RETURN TO LAB

The completed mailer should include:
1. Completed test form with all required data
2. The slide in the slide holder
Seal the prepaid mailer and place with mail for USPS delivery to OraCDx® Laboratories.

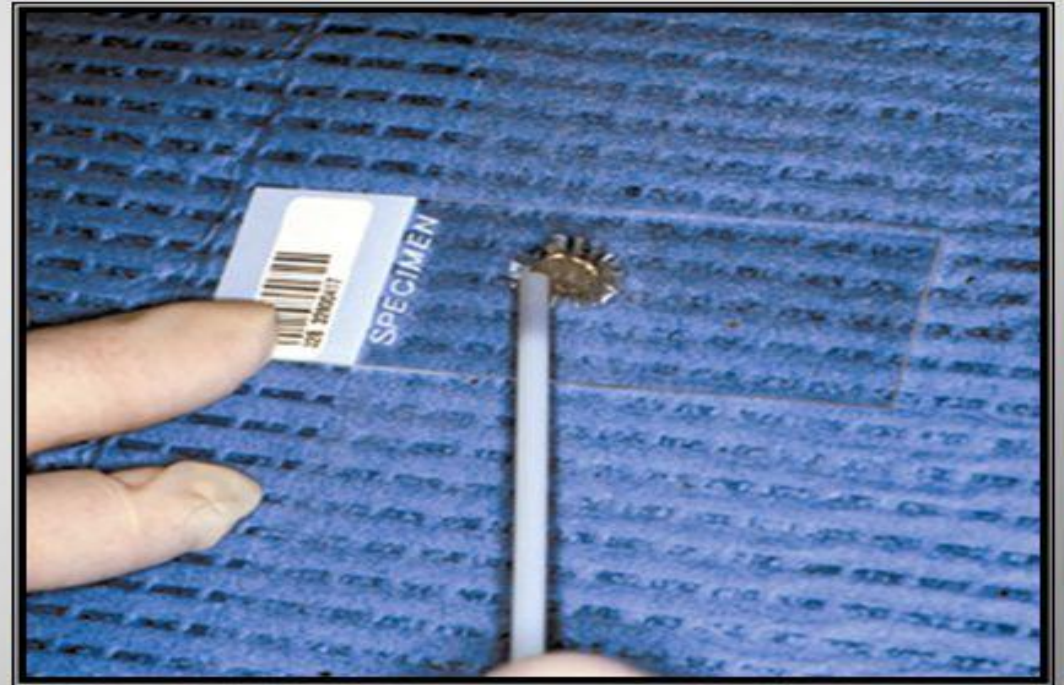


6 ANALYSIS & FOLLOW-UP

The specimen will be analyzed by specially-trained pathologists assisted by computer analysis. OraCDx® provides you with a lab report as well as follow-up support.

Slide Preparation

- Immediately spread on slide
- Rotate brush- spread material along entire slide
- Use all fixative
- Air dry 20 minutes



1- Gingival biopsy

in cases of **exophytic**, peripheral and **pedunculated** lesions



Gingival biopsy



2- Tongue biopsy

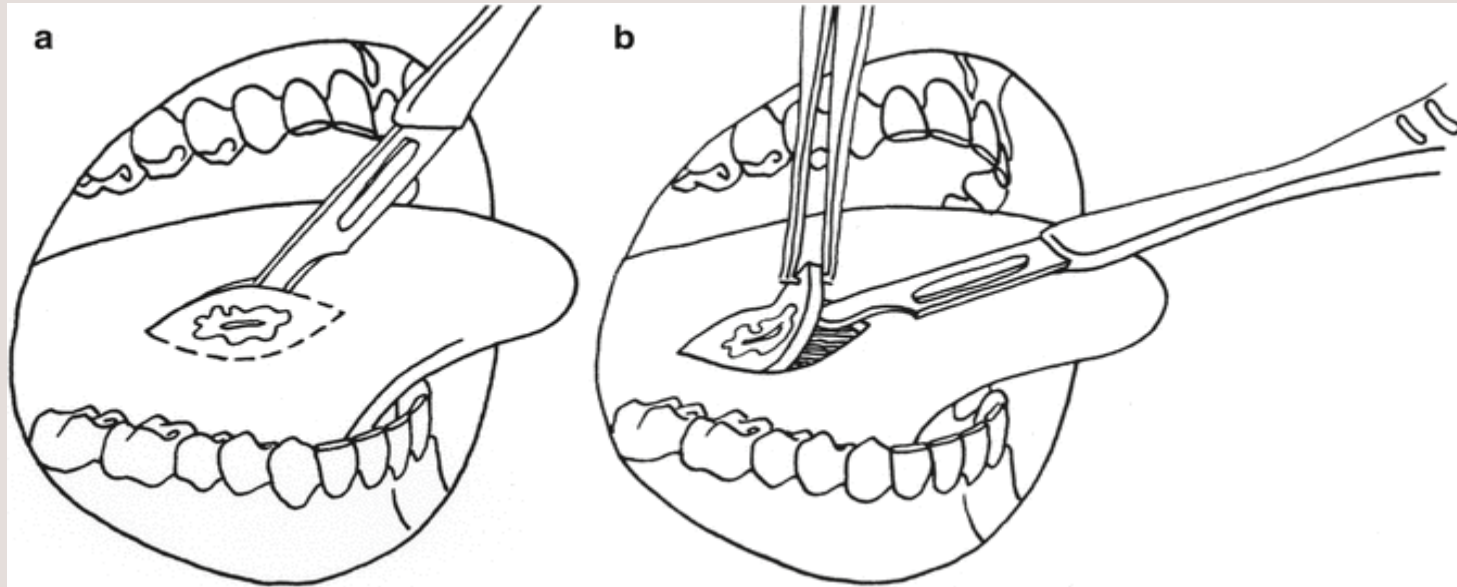
to remove a small piece of the tongue



Tongue biopsy



Tongue Excisional Biopsy



3- Buccal biopsy

Traumatic Fibroma of Buccal Mucosa



Fig. 11.1. Traumatic fibroma of buccal mucosa



Fig. 11.2. Two traction sutures are passed through the base of the lesion, which help retract the lesion during the surgical procedure



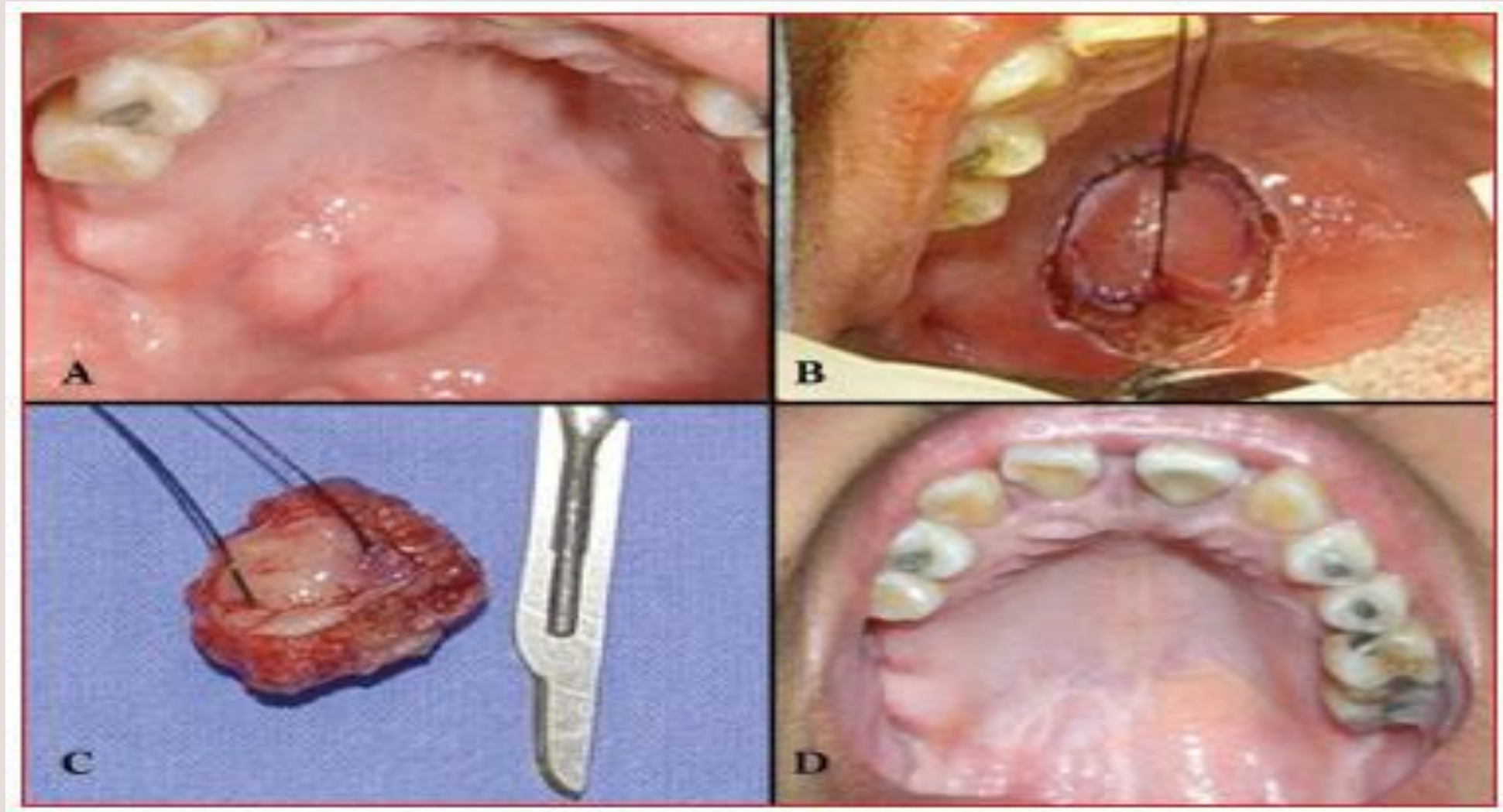
Fig. 11.3. Elliptical incision around lesion with scalpel



Fig. 11.4. Reflection of lesion from underlying tissues with scissors

4- Palatal biopsy

Indications: inflammatory lesions, salivary gland lesions and tumors



5- Labial biopsy

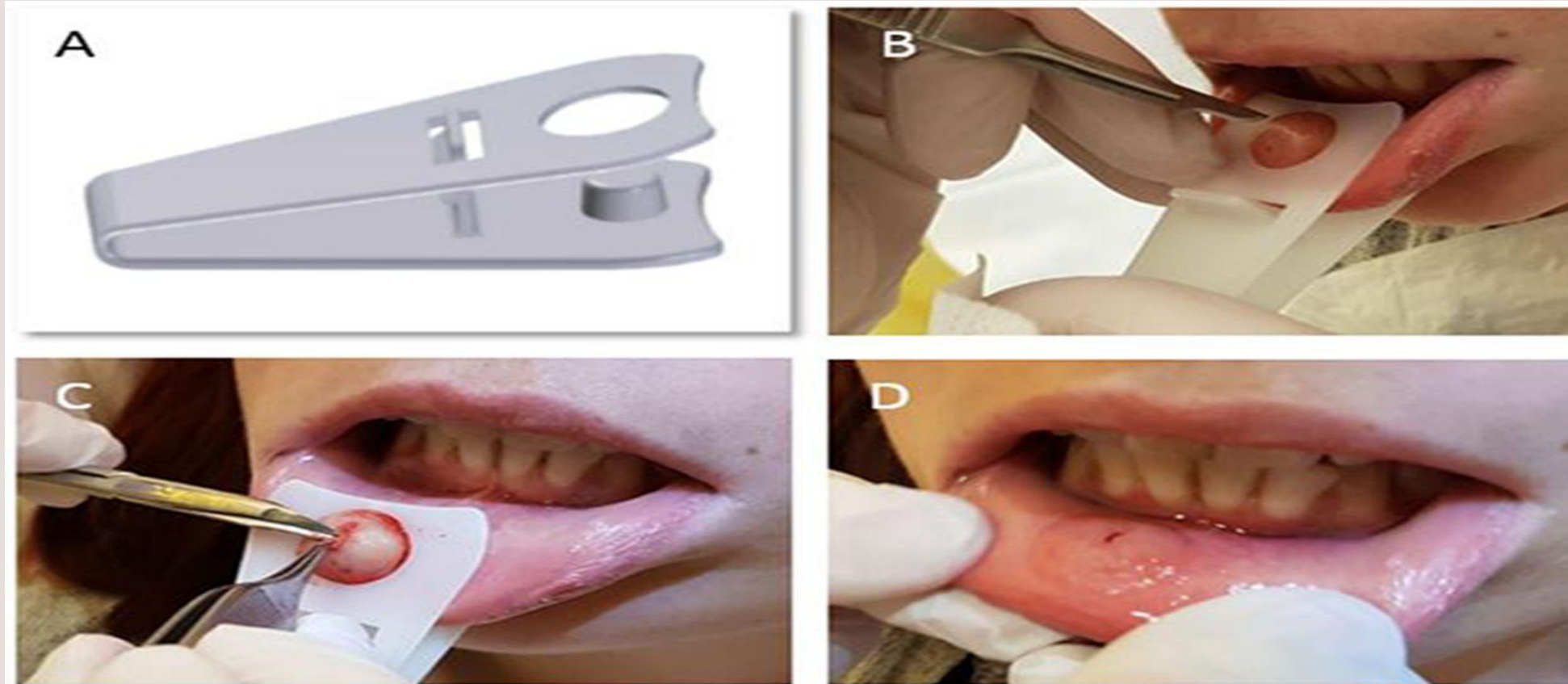
Indications: minor salivary gland lesions



Labial biopsy



Technique for Labial biopsy: using a clamp



Hard tissue (Intraosseous) biopsy

Fine needle aspiration (FNA)

Aspirates should be taken in supine or in sitting position with head support

No pre medication or local anesthesia is needed

Strict aseptic conditions

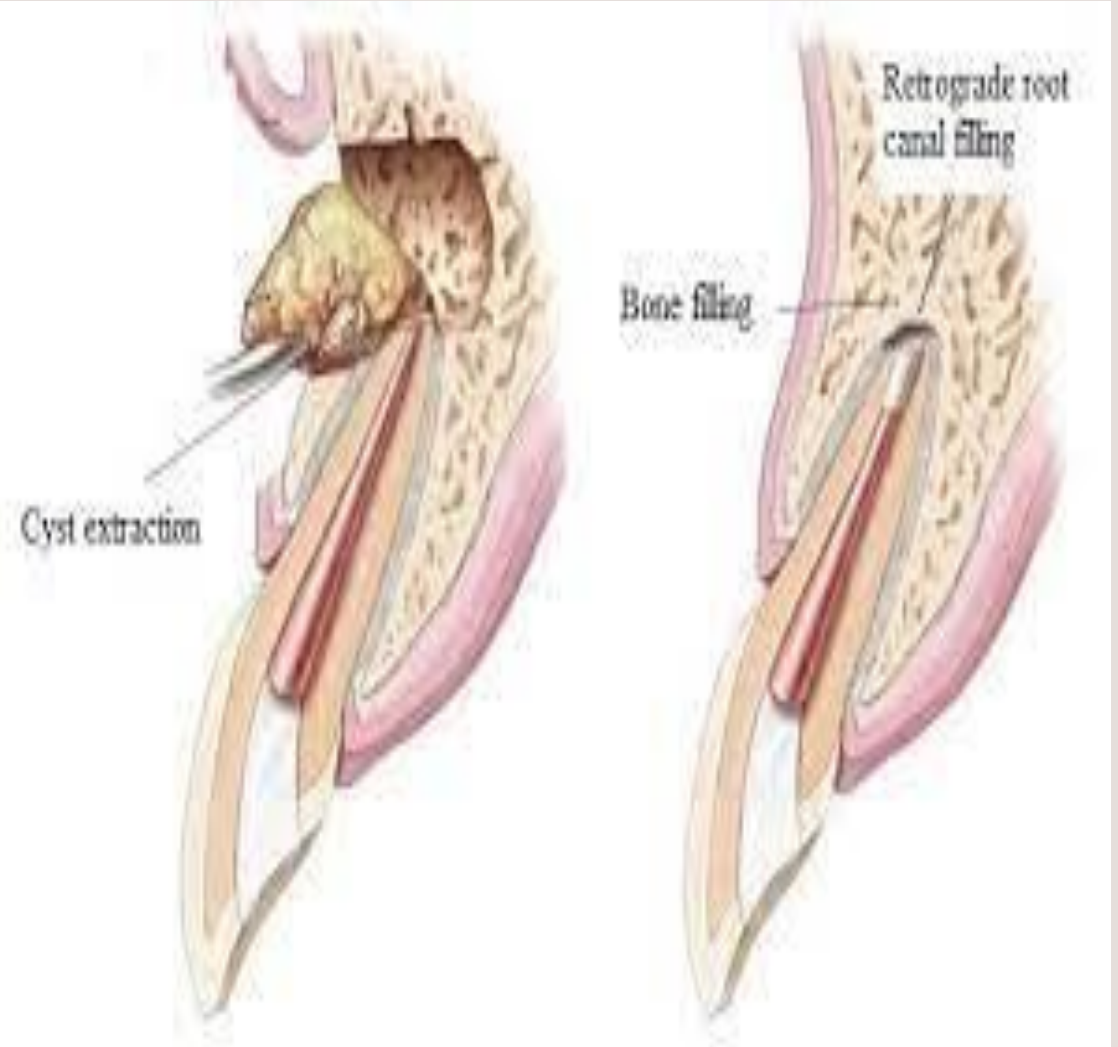
FNA for cystic lesions: initial evaluation



Biopsy from Oral Cyst

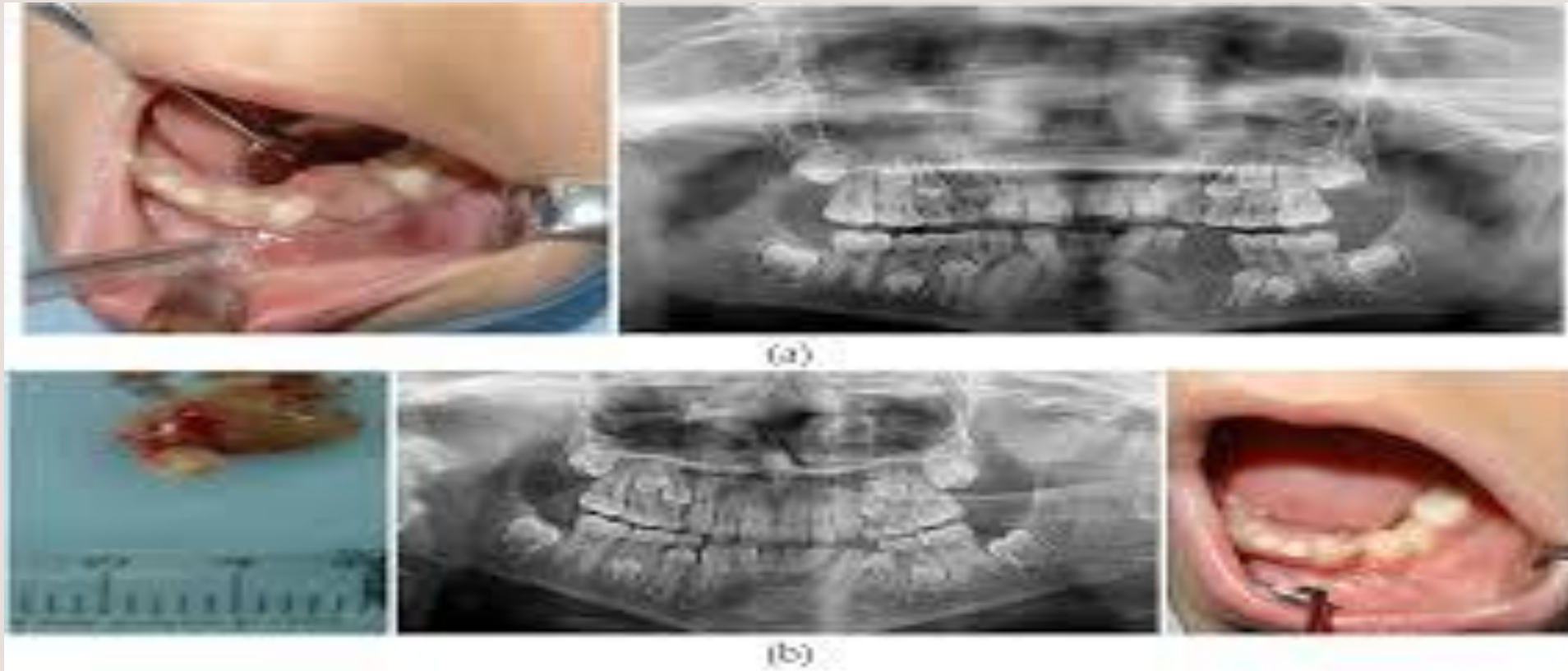
Enucleation biopsy (Excisional biopsy) is performed for jaw cysts where the lining and content of the cyst are removed





Intraosseous tumors

Requires **general anesthetics** to make you unconscious during the procedure.
Should be performed in the hospital



After a biopsy

The tissue sample removed during a biopsy is called a **specimen**

1- The specimen is placed in **a container and preserved in fixative**

Typically formalin is used to preserve the proteins in the cells

2- The container is labeled with ***patient's name*** and other details (**gender, age, site, size and date**)

3- In **a separate paper**, all details (**name, date, chief complains, duration, color, consistency of lesion, the presence of pain, radiographic findings, drugs, previous medical history, type of incision and clinical diagnosis**) must be written

4- Radiographs (for intraosseous lesions) must be provided



THANK YOU

FOR

WATCHING