Department of Oral diagnosis

A- Basic information

1-Subject title	**Oral Pathology**	
2-Number of credits	Theory:4	Laboratory:3
3-Number of contact hours	Theory:2h/week	Laboratory:3h/week
4-Subject time	Fourth Year	

No.	Title of the lectures	Hours
1	introduction and Principles of biopsy techniques	2
2	Dental caries	2
3	Pulp pathology	2
4	Periapical pathology	2
5	Bone infection	2
6	Bone diseases (Genetic diseases, metabolic diseases; fibro-osseous lesions)	2
7	Bone diseases (Genetic diseases, metabolic diseases; fibro-osseous lesions)	2
8	Bone neoplasms	2
9	Bone neoplasms	2
10	Developmental disturbances	2
11	Developmental disturbances	2
12	Developmental disturbances	2
13	Developmental disturbances	2
14	Odontogenetic tumors and cysts	2
15	Odontogenetic tumors and cysts	2
16	Oral mucosal lesions and Infection	2
17	Oral mucosal lesions and Infection	2
18	Oral mucosal lesions and Infection	2
19	Red and White lesions	2
20	Pigmented lesion	2
21	Vesiculo-bulbous lesions and ulcerative lesions	2
22	Vesiculo-bulbous lesions and ulcerative lesions	2
23	Oral epithelial lesions and Tumors	2
24	Oral epithelial lesions and Tumors	2
25	connective tissue tumors	2
26	connective tissue tumors	2
27	Diseases of Salivary glands	2
28	Tumors of Salivary glands	2
29	TMJ pathology and osseointegration	2
30	Forensic pathology	2
Total		**60**

Biopsy

- What is Biopsy?
  - Biopsy is the removal of tissue from a living organism for the purpose of microscopic examination and diagnosis

Biopsy is the removal of tissue from a living individual for a diagnosis by histopathological examination. The use of biopsy is not restricted to the diagnosis of the tumors,but is invaluable in determining the nature of any unusual lesion.' However not all lesions present a specific microscopic appearance and for this reason a definitive diagnosis cannot always be made. The need for special techniques in surgical pathology is sometimes needed to reach a final diagnosis.

Indication For Biopsy

- Persistant hyperkeratosis changes in surface tissue
- Lesion that interfere with local function
- Any inflammatory lesion that does not respond to local treatment after 10 to 14 days

Indication For Biopsy

- Bone lesions not specifically identified by clinical and radiographic finding
- Any lesion persists for more than 2 weeks with no apparent etiology basis
- Any lesion that has the characteristics of mailgnancy

Characteristics of Lesion that raise the suspicion of Malignancy

- Growth rate – Lesion exhibits rapid growth
- Bleeding – Lesion bleeds on gentle manipulation
- Induration – Lesion and surrounding tissue is firm to the touch
- Fixation – Lesion feels attached to adjacent structures
- Erythroplakia – Lesion is totally red or has speckled red appearance
- Ulceration – Lesion is ulcerated or presents as an ulcer
- Duration – Lesion has persisted for more than 2 weeks

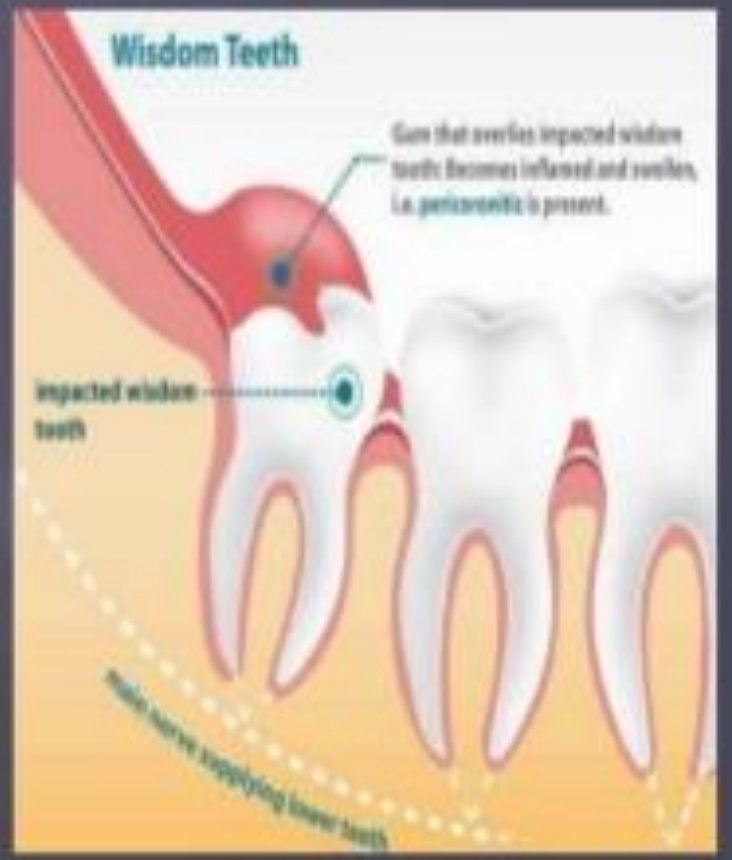
Characteristics of Lesion that raise the suspicion of Malignancy

Erythroplakia

Ulceration

Oral Biopsy not Needed In

- There is no need to biopsy normal structures.
- There is no need to biopsy for inflammatory or infectious lesions that respond to specific local treatments, as pericoronitis, gingivitis or periodontal abscesses.
- No incisional biopsies should be performed on suspected angiomatous lesions.



Contra-Indications

- When the general health condition of the patient is very poor
- When acute virulent pyogenic infection is present
- Pulsating lesions (those of vascular nature)
- Pigmented lesions (melanoma) should not biopsied as it may transform into malignant by cutting through it or may spread to distant organs

Contra-Indications

- Biopsy is not advised in case of multiple **neurofibromas,** due to the risk of neurosarcomatous transformation, or in tumors of the major salivary glands. Such biopsies must be performed by specialized surgeons

Objectives of Biopsy

- To confirm a diagnosis made on clinical findings
- To determine the treatment plan
- Valuable self teaching diagnostic aid
- As a medical record

Classification Of Biopsy

- Area of surgical removal :
  - Incisional biopsy : Consists of the removal of a representative sample of the lesion and normal adjacent tissue in order to make a definitive diagnosis before treatment.

Classification Of Biopsy

- Area of surgical removal :
  - Excisional biopsy : Is aimed at the complete surgical removal of the lesion for diagnostic and therapeutic purposes. This procedure is elective when the size and location of the lesion allow for a complete removal.

Types of Biopsy

- Surgical biopsy
  - Incisional biopsy
  - Excisional biopsy
  - Punch biopsy
- Fine needle aspiration cytology (FNAC)
- Frozen section biopsy
- Brush biopsy
- Exfoliative cytology

Types of Biopsy

- Core needle / Thick needle biopsy
- Suction assisted core needle biopsy
- Laser biopsy

Principles of Biopsy

- Choose most suspicious area
- Avoid sloughs or necrotic areas
- Give regional or local anaesthetic – not into the lesion
- Include normal tissue margin
- Specimen should preferably be at least 1 x 0.6 cm by 2 mm deep

Principles of Biopsy

- Pass a suture through the specimen to control it and prevent it being swallowed or aspirated by the suction
- For large lesions, several areas may need to be sampled
- Include every fragment for histological examination
- Label specimen bottle with patients name and clinical details
- Suture and control bleeding

Incisional Biopsy

- Incisional Biopsy :
  - If a lesion is large or has different characteristics in various locations more than one area need to be sampled.

Incisional Biopsy

- Indications
  - Size limitations
  - Hazardous location of the lesion
  - Great suspicion of malignancy
- Disadvantages
  - Crush, splits and haemorrhage are the artefacts most frequently found in incisional biopsies
  - Theoretical seeding of cancer cells into the adjoining tissues

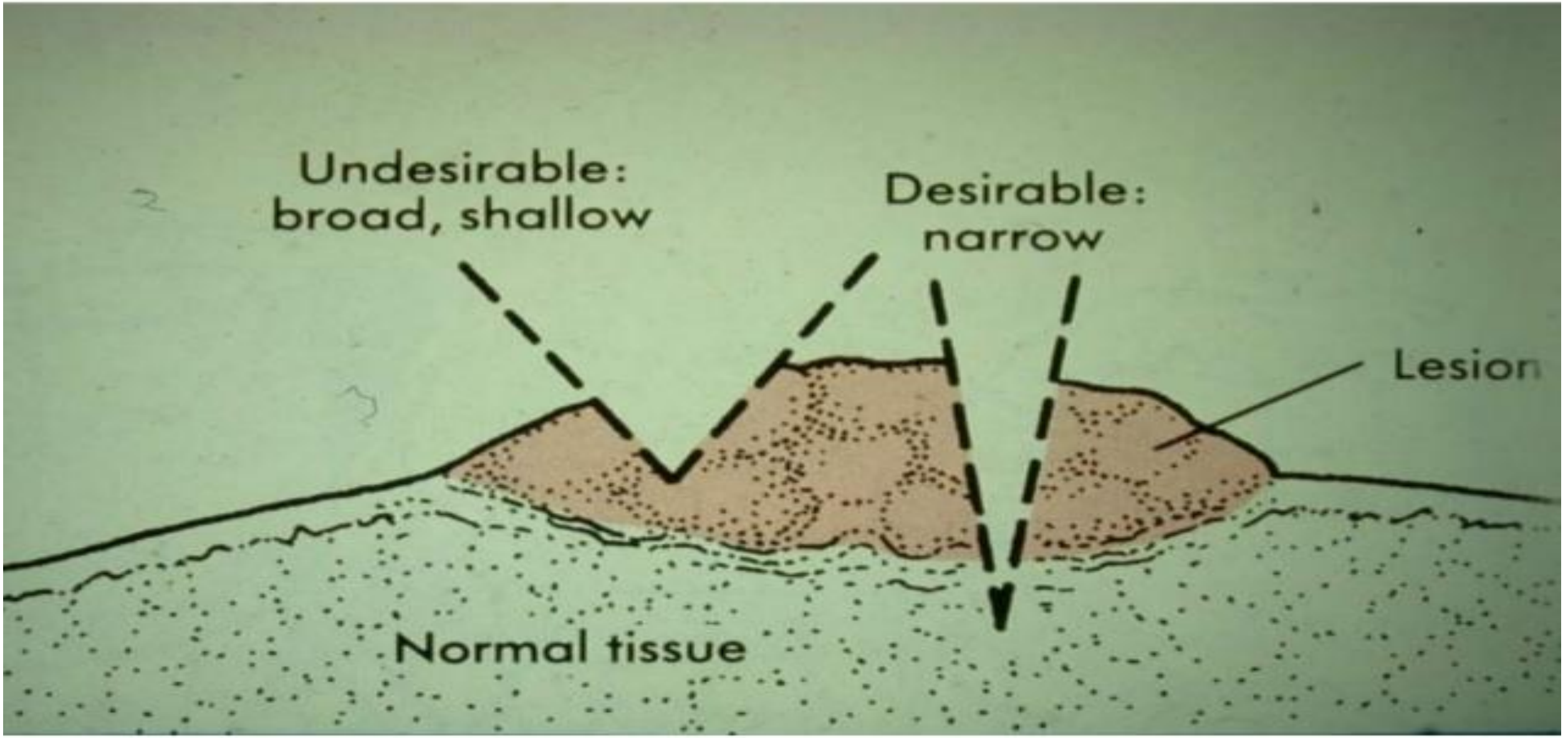
Incisional Biopsy

- Technique
  - Representative areas are biopsied in a wedge fashion
  - Margins should extend into normal tissue on the deep surface
  - Necrotic tissue should be avoided
  - A narrow deep specimen is better than a broad shallow one

Incisional Biopsy

Incision should extend from the ulceration out onto clinically normal tissue

Grasp area should be removed with forceps and make an elliptical incision from the centre out onto clinically normal tissue – Wound after removal of incised tissue – suturing complete


Undesirable:
broad, shallow
Desirable:
narrow
Lesion
Normal tissue

Excisional Biopsy

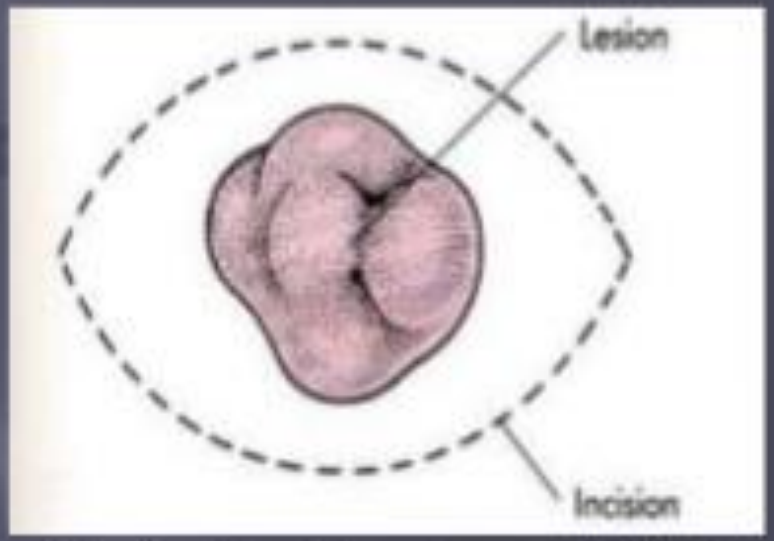
- Excisional Biopsy :
  - An excisional biopsy implies the complete removal of the lesion.
  - The entire lesion with 2 to 3 mm of normal appearing tissue surrounding the lesion is excised if benign

Excisional Biopsy

- Indications :
  - Should be employed with small lesions, less than 1 cm
  - The lesion on clinical exam appears benign
  - When complete excision with a margin of normal tissue is impossible without mutilation

Excisional Biopsy

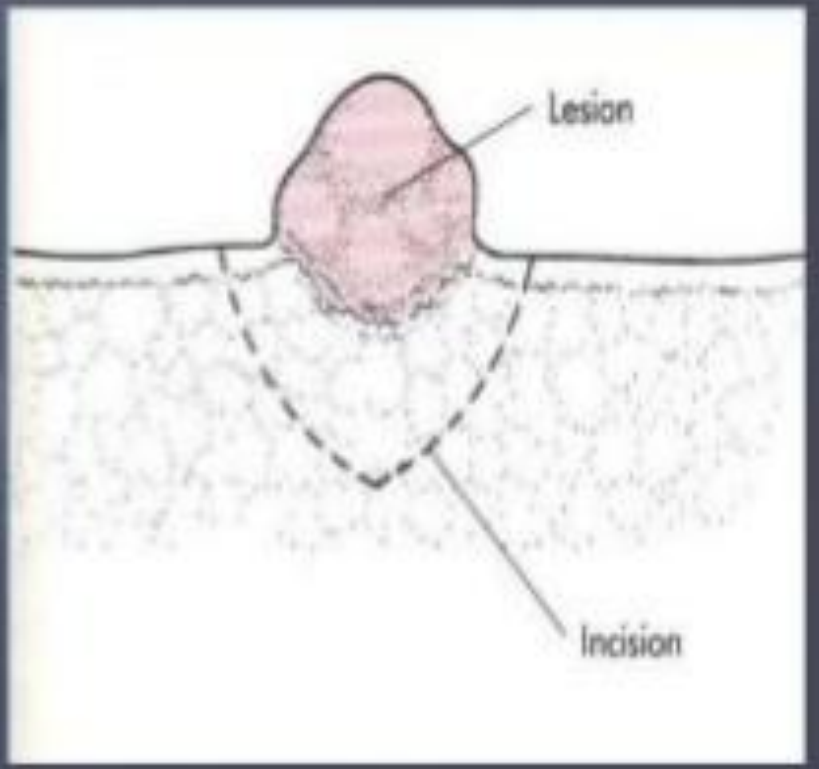
- Technique :
  - The entire lesion with 2 to 3 mm of normal appearing tissue surrounding the lesion is excised if benign

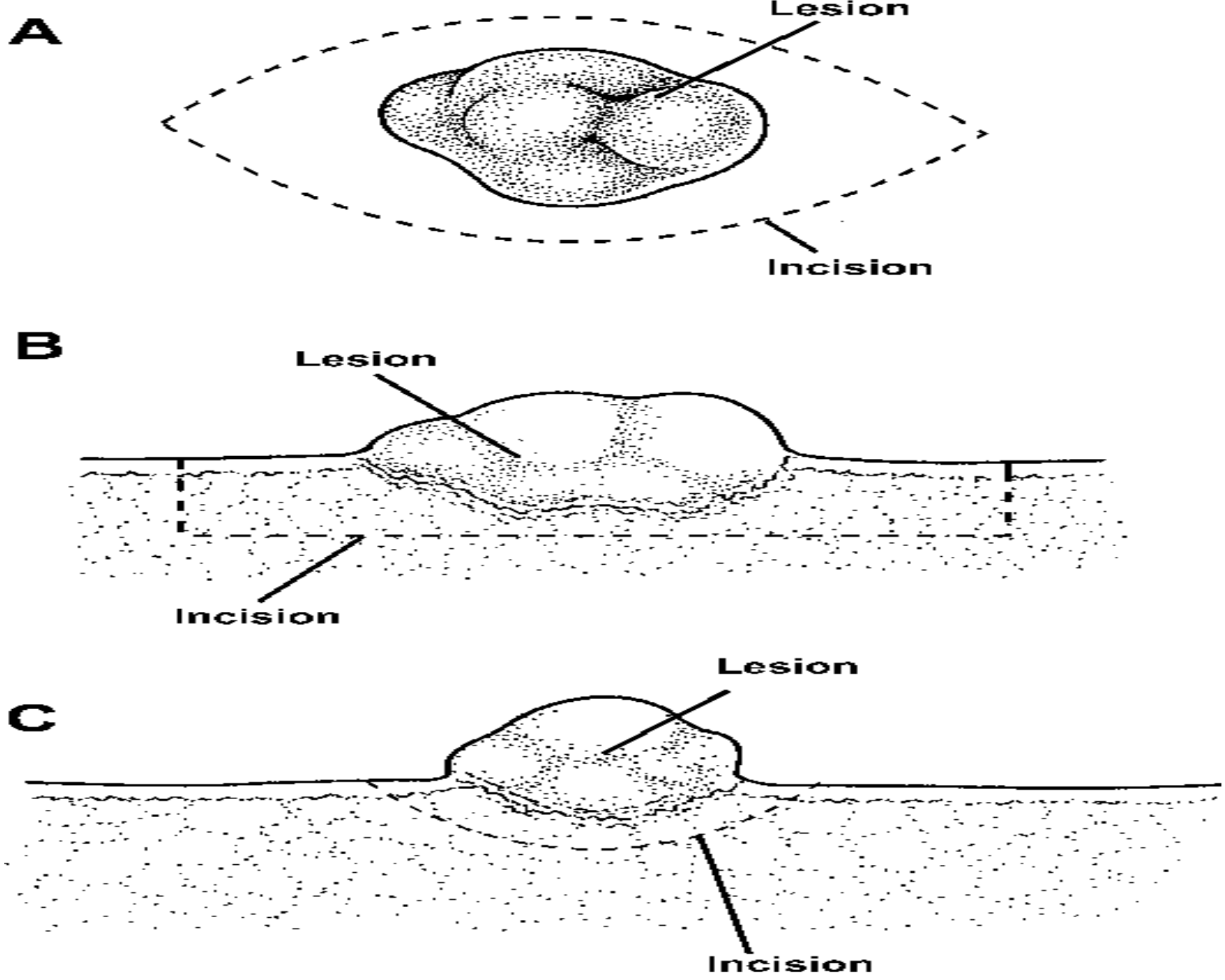


Elliptical incision is carried out allowing for a narrow rim of nor peripheral tissue

Excisional Biopsy

- Technique :
  - Bevelling the incisions to a narrow "V" base facilitates wound closure




A
Lesion
Incision
B
Lesion
Incision
C
Lesion
Incision

FROZEN SECTION

Frozen section technique allows a stained slide to be examined within 10 minutes of taking the specimen.

The tissue is sent fresh to the laboratory to be quickly frozen,preferably to about -70'c,for example immersion in liquid nitrogen or dry ice.

.A section is then cut on a refrigerated microtome and stained.

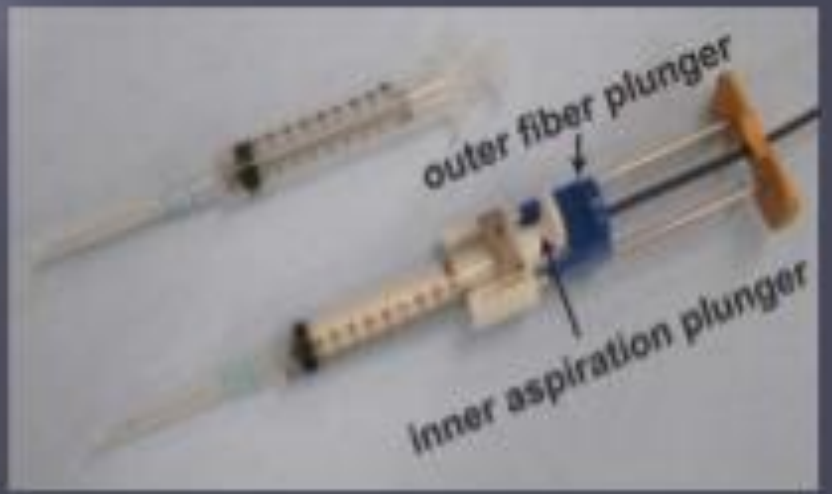
Advantage and limitation of Frozen section

- Advantage:
- >Can establish ,at operation ,whether/not a tumor is malignant and whether excission needs to be extended
- >Can confirm ,at operation,that excission margins are free of tumor

- Limitation of frozen section:
- Freezing artefacts due to poor technique can distort the cellular picture
- Definitive diagnosis sometime impossible.

Fine Needle Aspiration Cytology

- Fine Needle Aspiration Cytology :
  - It is the technique of Aspiration of cells / fluid / tissue fragments using a fine needle for examination under a microscope.



Fine Needle Aspiration Cytology

- Indications :
  - Non palpable lesions, or area difficult to Biopsy but can be localized by CT, MRI, Ultrasound.
  - To rule out vascular lesions prior to open surgery
  - In cases where Biopsy is contraindicated on medical background.
  - Indicated for known tumours to assess effect of treatment.
  - Used to obtain tissue for specific studies.

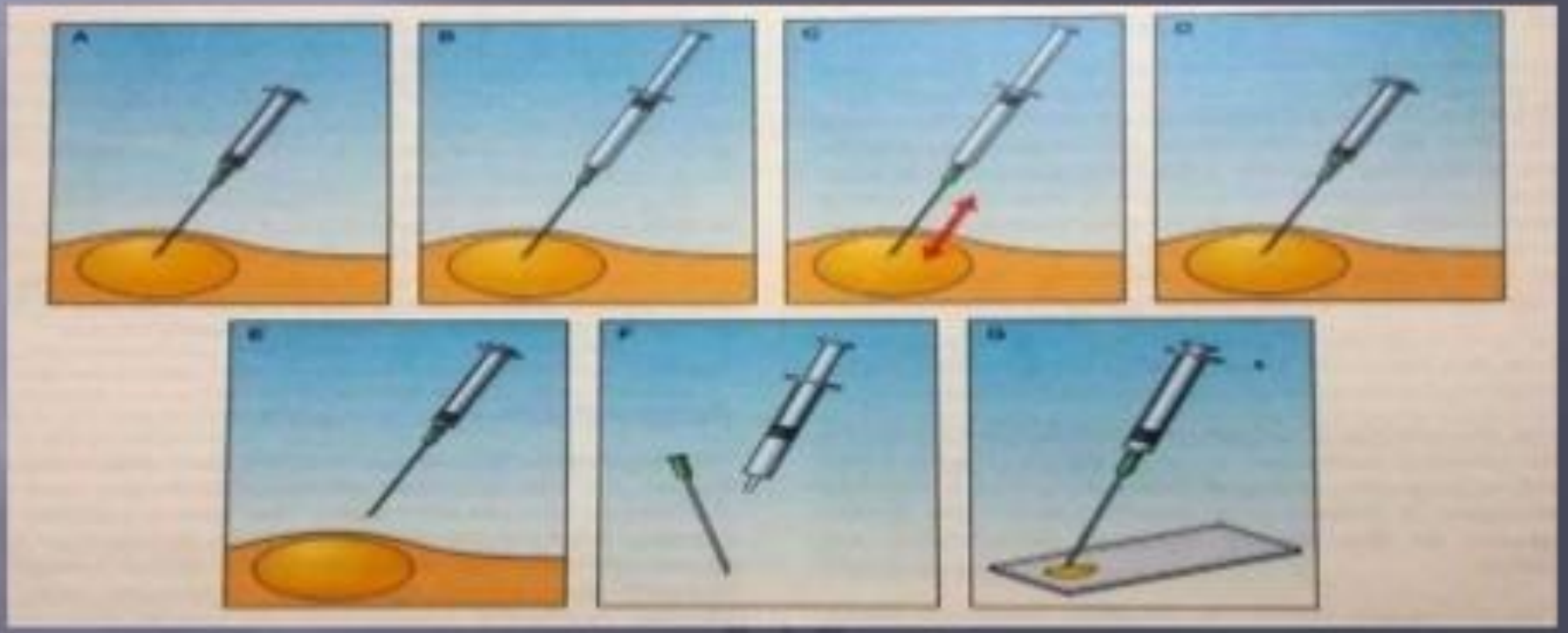
Fine Needle Aspiration Cytology

- Technique :
  - FNAC with aspiration
  - FNAC without Aapiration

Fine Needle Aspiration Cytology

- FNAC with aspiration :
  - Site of FNAC should be cleaned by spirit swab
  - Needle is introduced in the swelling and is gently moving to and fro. Simultaneously negative suction is also created by withdrawing the piston
  - Air is taken in the syringe and needle is reattached
  - The aspirated material is expelled and the smear is made by gently pressing the upper slide on the lower

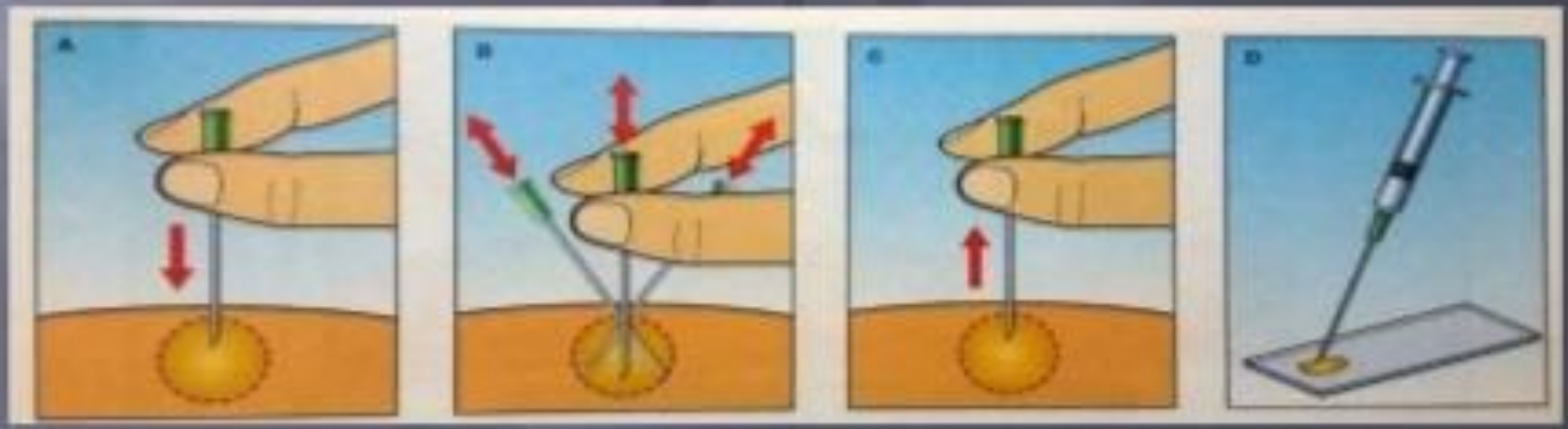
Fine Needle Aspiration Cytology



Repeatedly passing a needle, under negative pressure, through a lesion to collect cells

Fine Needle Aspiration Cytology

- FNAC without aspiration :
  - Introduced by Zajdela in 1987
  - Based in the observation that the capillary pressure in a fine needle is sufficient to keep the detached cell inside the lumen of the needle



Fine Needle Aspiration Cytology

- Advantages :
  - The technique is relatively painless, produces speedy results.
  - It requires little equipment.
  - The technique can be done as an out patient or a bed side procedure.
  - There is no problem with wound healing.
  - The technique is readily repeatable

Core Biopsy / Thick needle

#Advantage:

1.Needle upto 2 mm diameter is used to remove a core of tissue

2.Specimen proceed as for a surgical biopsy

3.Larger sample than FNA ,preserve tissue architecture in the specimen.

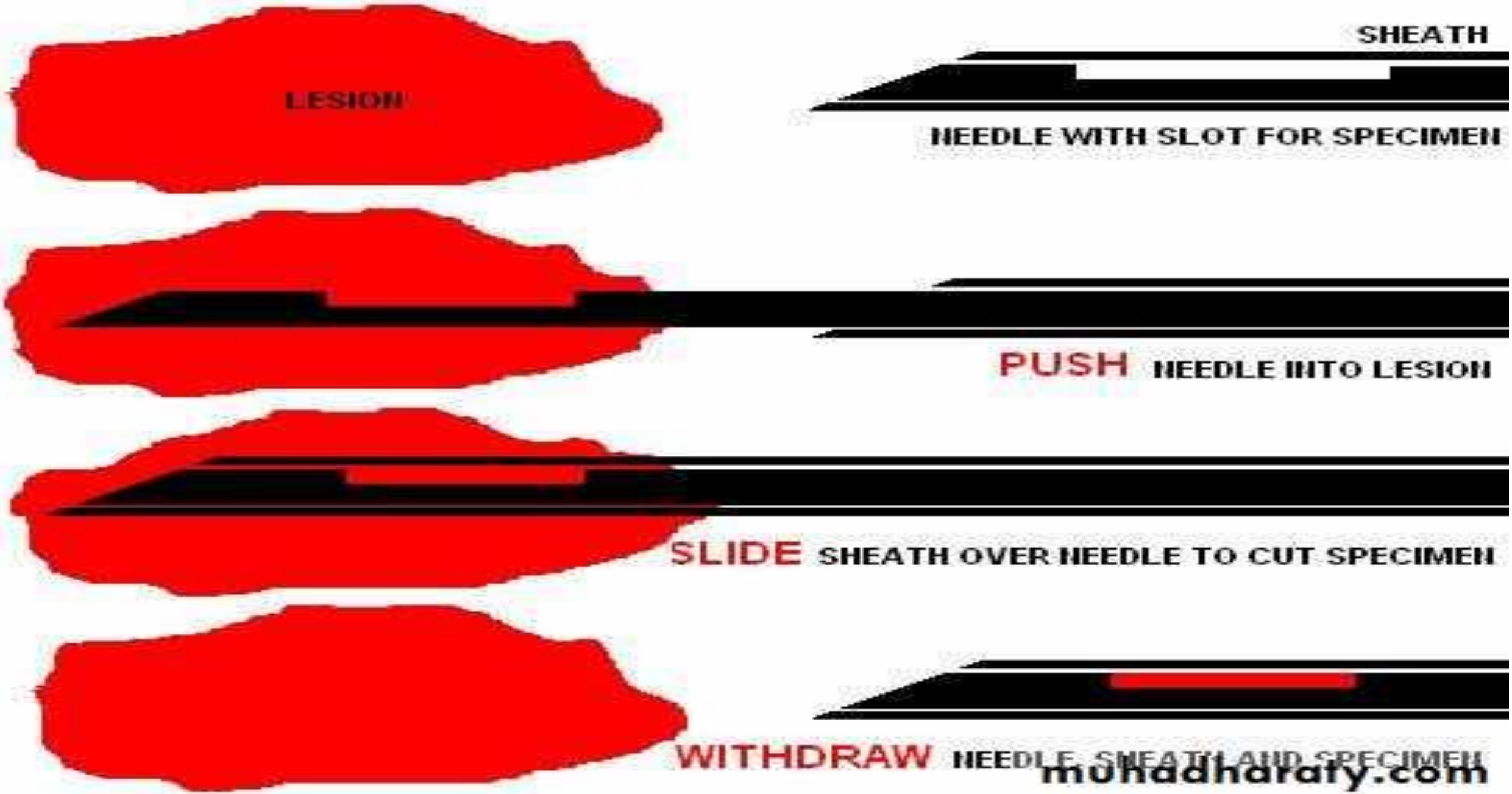
4.Definitive diagnosis more likely than FNA

#Limitation:

1.Risk of seeding some neoplasm in tissue

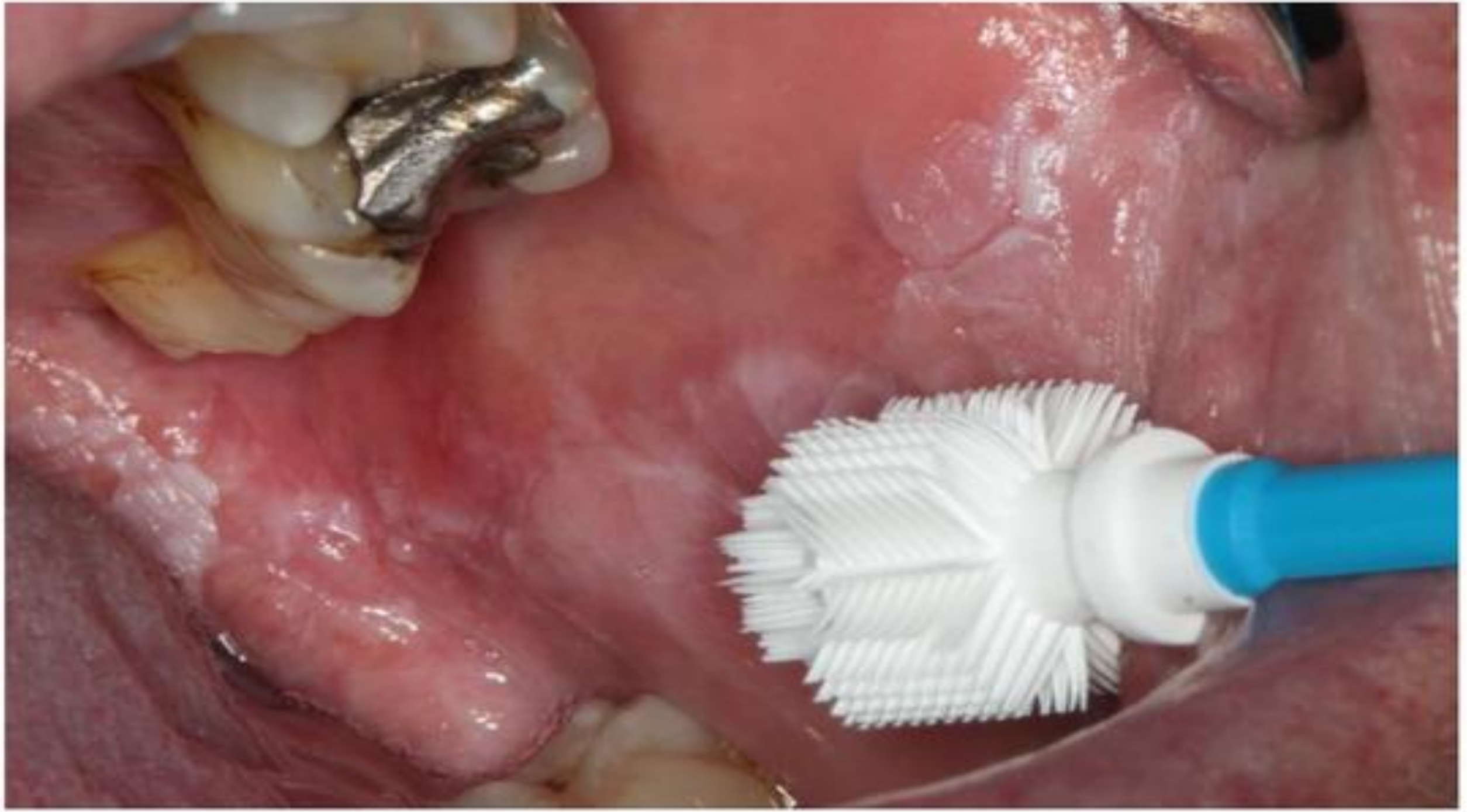
2.Risk of damaging adjacent anatomical structure

PRINCIPLE OF TRUCUT BIOPSY



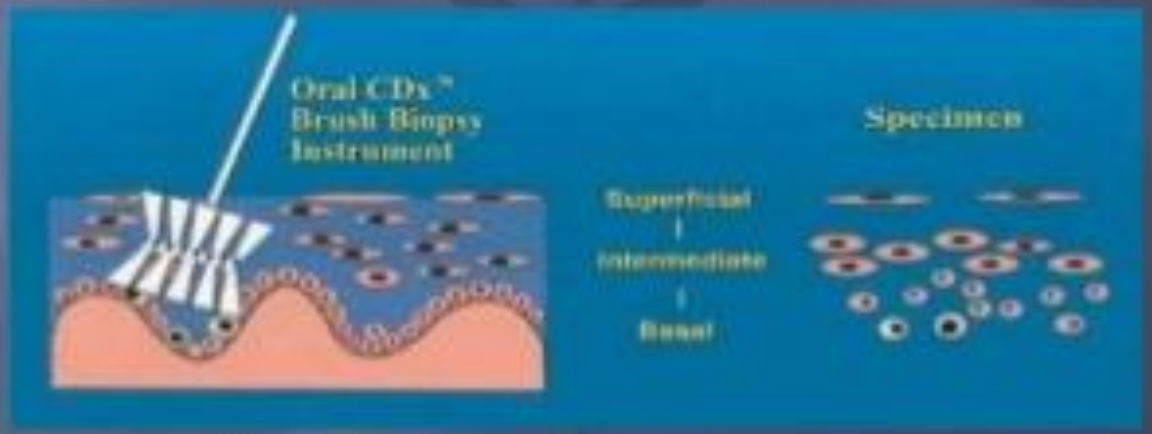
Brush Biopsy

- Brush Biopsy :
  - It has recently been proposed that cytological examination of brush biopsy samples is a non-invasive method of determining the presence of cellular atypia, and hence the likelihood of oral epithelial dysplaisa



Brush Biopsy

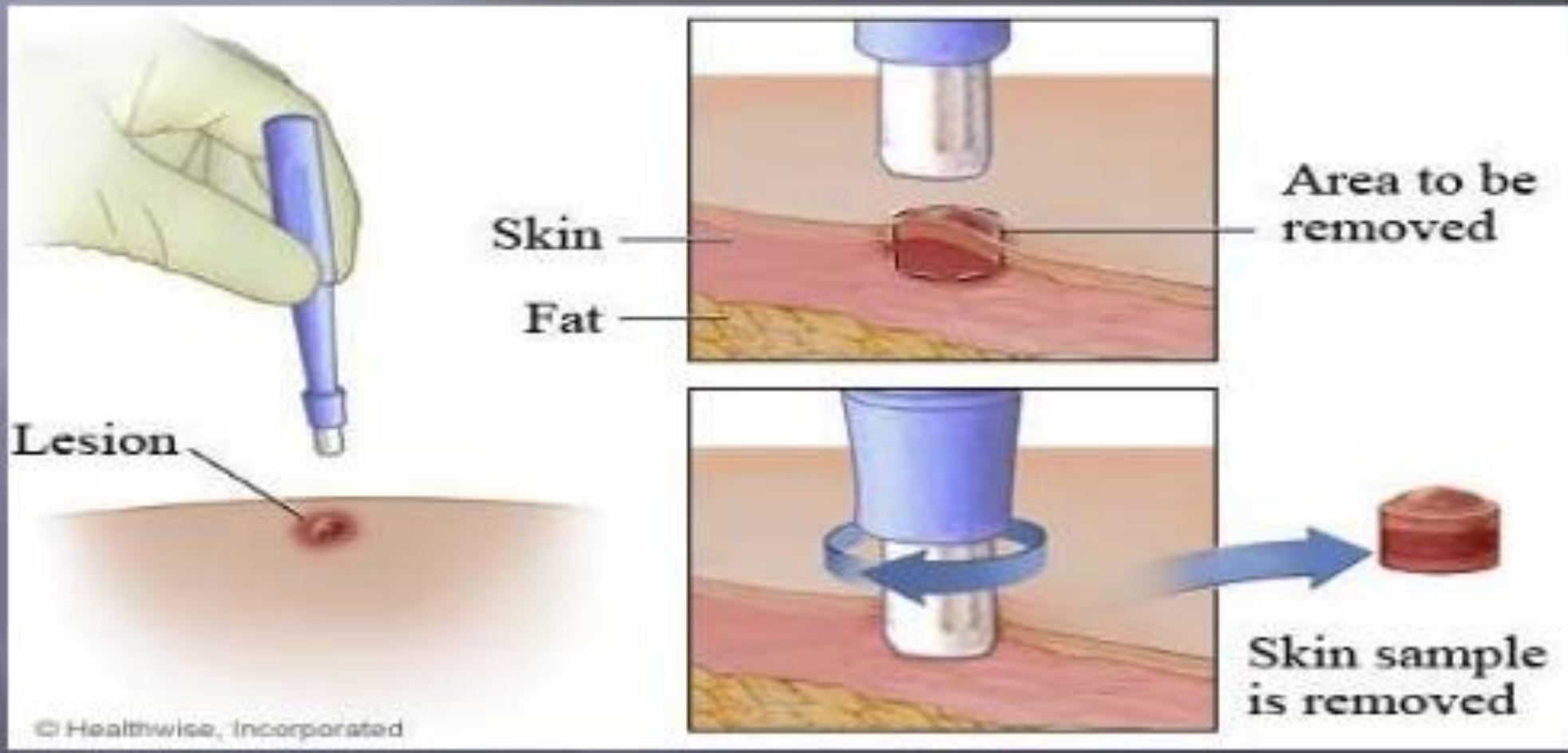
- Technique :
  - The brush – rotated under slight pressure several times on the suspicious lesion
  - Immediately smeared on glass slides and fixed with alcoholic spray

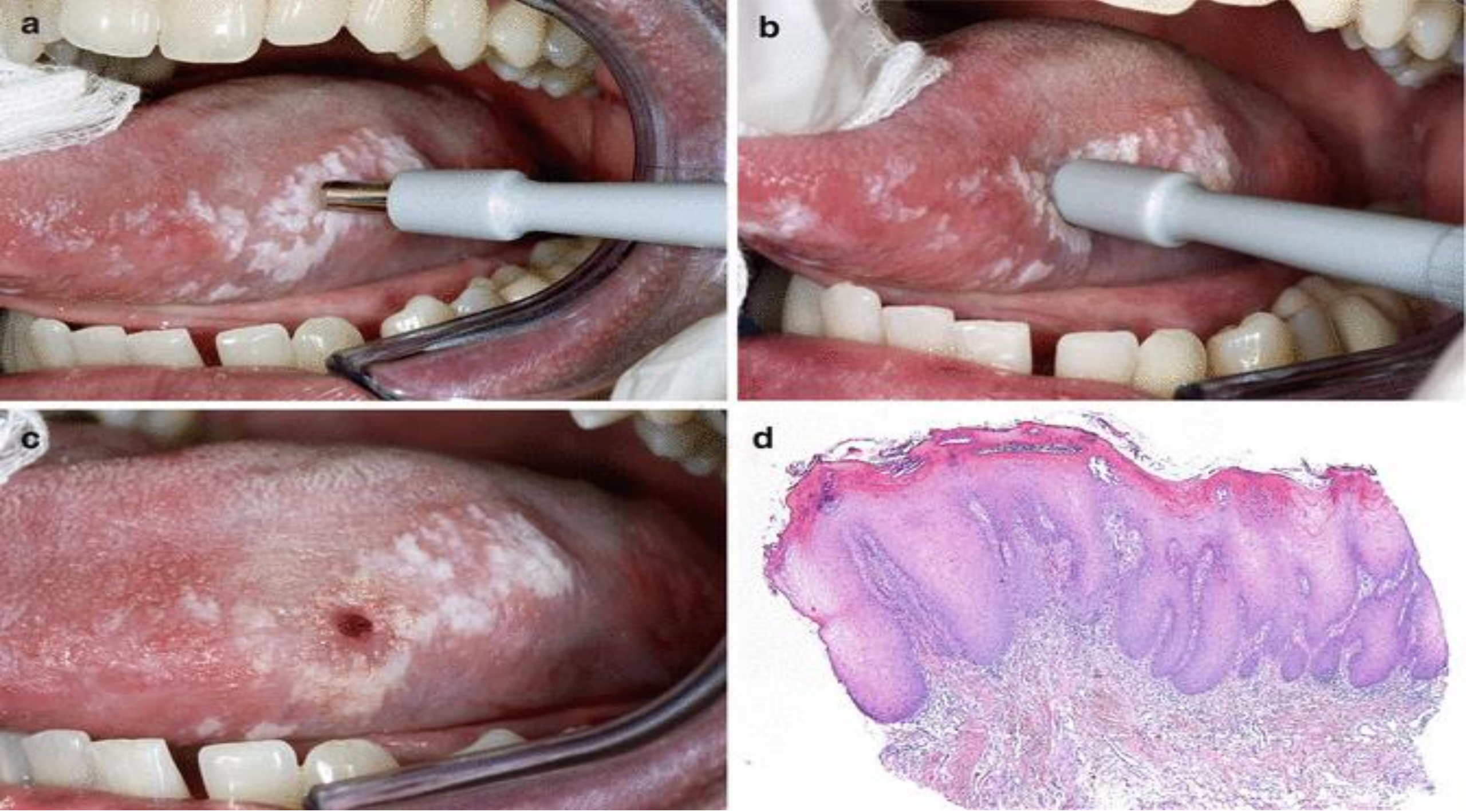


Punch Biopsy

- Punch Biopsy :
  - Punch biopsy is considered the primary technique to obtain diagnostic, full thickness skin specimens. It is performed usuing a circular blade or trephine attached to a pencil-like handle.

Punch Biopsy




a
b
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d

Exfoliative Cytology

- Exfoliative cytology :
  - It is a quick and simple procedure,It is an important alternative of biopsy in certain situations.
  - In Exfoliative cytology, cells shed from body surfaces, such as in side the mouth, are collected and examined

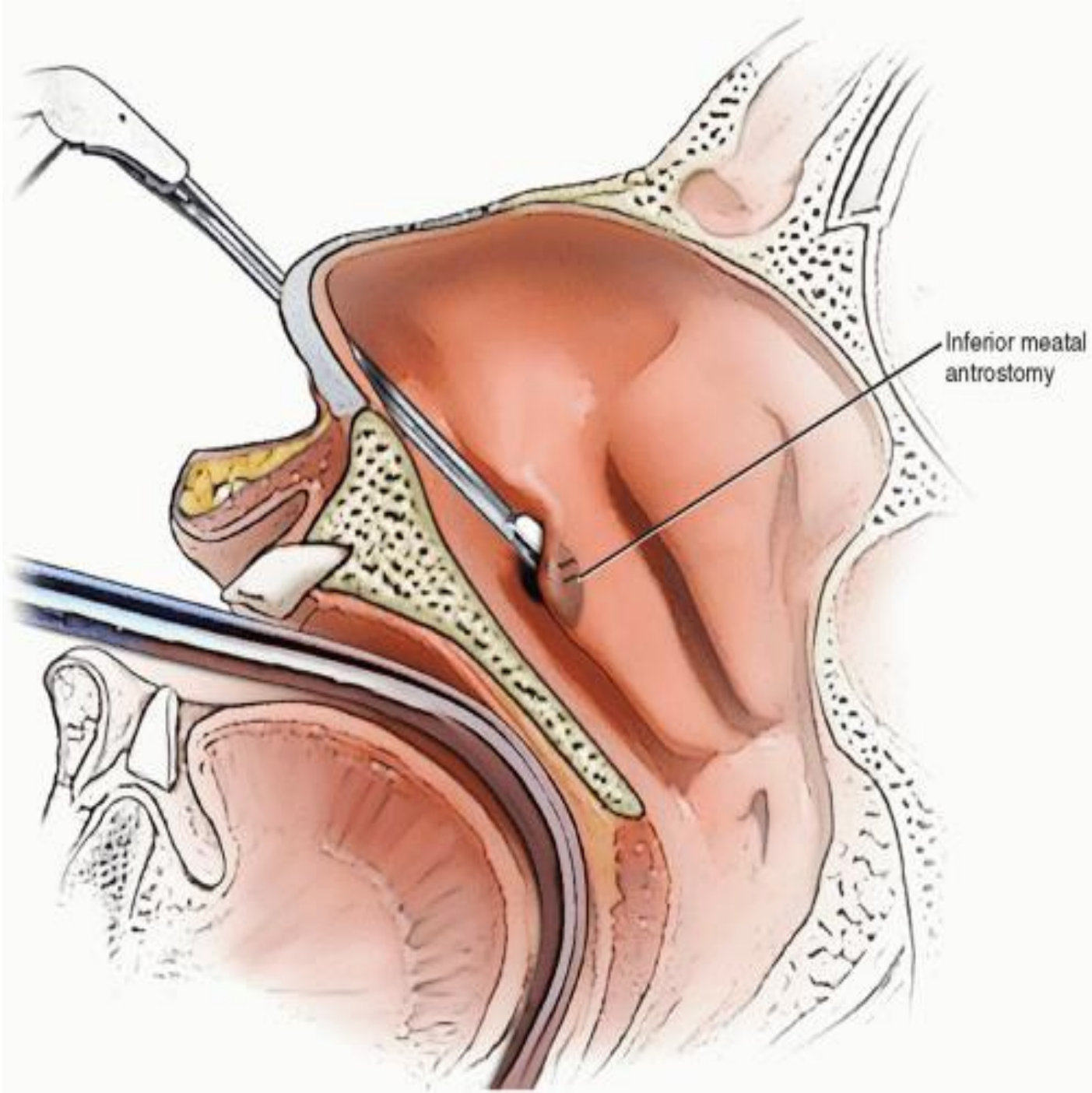
Exfoliative Cytology

- Indication :
  - Diffuse, large or multiple lesions
  - Urgent result is required
  - Patient is not indicated for surgery

- Technique :
  - Scrap the lesion with stainless steel spatula or moistened toungue depressor
  - Cells smeared on glass slide

5-Endoscopic Biopsy Endoscopic biopsy is a very common type of biopsy that is done through an endoscope (a fiber optic cable for viewing inside the body) which is inserted into the body along with sampling instruments.


13 cm - 5⅛"
New-Med
Instruments


Inferior meatal
antrostomy

Immunohistochemistry

Briefly stated,immunohistochemistry is the application of immunologic principles and techniques to demonstrate molecules in cells and tissues. The original method, brilliantly conceived by Coons, consisted of labeling with a fluorescent probe an antibody raised in rabbits and searching for it (and therefore for the antigen against which the antibody was directed) in tissue sections examined under a fluorescent microscope following incubation. The technical improvements that supervened in subsequent years have been responsible for these methods becoming a staple of the histopathology laboratory.

The most important diagnostic applications of immunohistochemical marker that have been applied widely to surgical pathology problems, whether as diagnostic aids, prognostic or predictive indicators, or as histogenetic probes are listed as follows:-

Actin. It is an extremely useful marker for the identification of smooth muscle cells and myofibroblasts

Albumin. Albumin comprises about one half of the blood serum proteins. It is potentially a good marker for hepatocellular and hepatoid carcinomas,

P53. Mutations of the *TP53* tumor-suppressor gene represent the most common genetic alteration in human tumors

S-100 protein. This is a family of acidic, dimeric, calcium-binding proteinsIts main use is in the evaluation of peripheral nerve sheath and melanocytic tumors

Desmin. This muscle-type intermediate filament (MW 55?000) is found in cells of smooth and striated muscle and in a lesser amount in myofibroblasts. Therefore it has been primarily used for the identification of smooth muscle and skeletal muscle tumors.

CD34. This marker stains normal and neoplastic endothelial cells, as well as a variety of soft tissue neoplasms, including dermatofibrosarcomaprotuberans, solitary fibrous tumor

LABORATORY PROCEDURE OF BIOPSY

1.fixation:

10% formal saline[formaldehyde solution in normal saline/neutral ph buffer]is routine fixative.It is necessary to prevent autolysis and destruction of microscopic structure of specimen.

2.Tissue processing:

The fixed tissue is dehydrated by immersion in a series of solvents and impregnated with paraffin wax.

continue

- 3.Embedding the tissue in paraffin.
- 4.Microtomy:Cutting thin section of biopsy tissue to place on glass slide
- 5.Staining the biopsy tissue:Haematoxylin and eosin are are two reagent for staining.


THIS TAB
OVER
KNIFE


MEM
SECT
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STOP
2
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MENU
Myr

Dangers of Biopsy

- Spreading of infection
- Haemorrhage
- Infection
- Operative trauma

Biopsy data sheet

- Patient Data
- History
- Clinical description
- Nature of Biopsy
- Radiographs & Photographs
- Discription of biopsy specimen

The Biopsy Report

- It should include :
  - The name of the clinician
  - Date the specimen was obtained
  - Pertinent characteristics of the specimen
  - The location / site, size, color, number, borders or margins, consistency, and relative radiodensity of the lesion

ARTIFACT

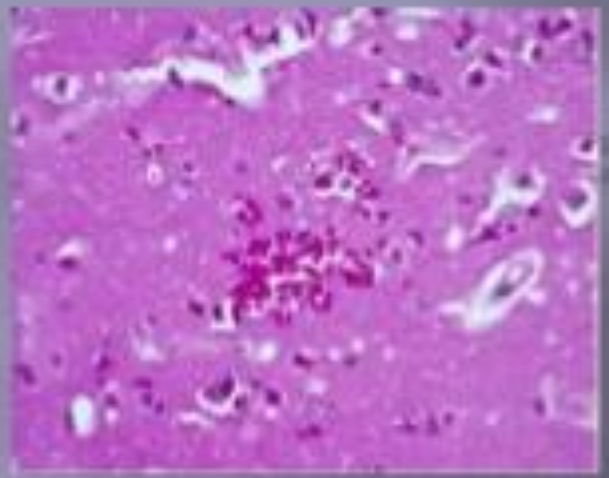
- ARTIFACT = Artificial (man made) product

- Artifacts are alteration in the tissue morphology that results from various forms of mechanical, chemical, or thermal insult to the tissue specimens removed for diagnostic purposes, anywhere from fixation to processiong to staining.

ARTIFACT

- Classification
  - Pre biopsy artifacts
    - They are introduced prior to the collection of the tissue
  - Biopsy artifacts
    - Injection of L.A. into the lesion
    - Improper handling of the tissue
      - Errors during manipulation of tissue
      - Heat artefact
      - Foreign bodies or starch artifact

ARTIFACT

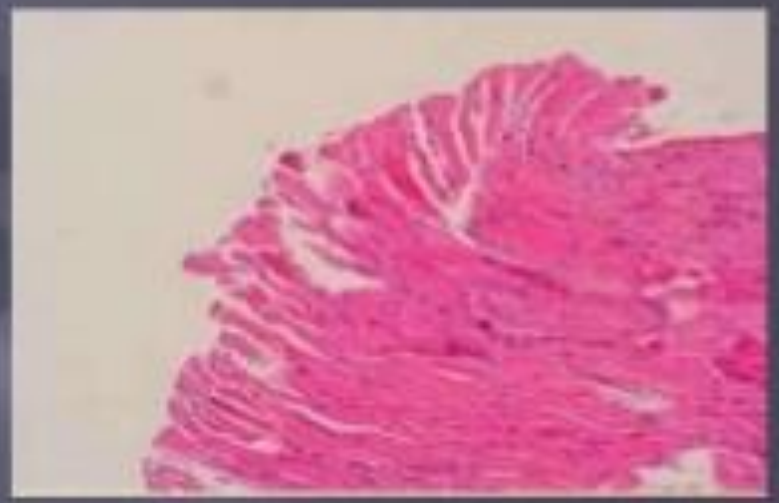


Injection Artifact

Improper Removal

ARTIFACT

Forceps Artifact



Crush Artifact

THE END