



Diagnostician's confirmatory tool - oral biopsy

<sup>1</sup> Mahendra R.Patait , <sup>2</sup>Reeta Patait, <sup>3</sup>Kedar Saraf, <sup>4</sup> Fareedi Mukram Ali, <sup>5</sup> Basavraj k.

<sup>1</sup> Professor ,MDS ,Dept of Oral Medicine & Radiology, SMBT Dental College,Sangamner, <sup>2</sup>Esthetic Dental Surgeon,Nashik, <sup>3</sup> Reader ,MDS ,Dept of Oral Medicine & Radiology,SMBT Dental College,Sangamner, <sup>4</sup>Reader ,MDS ,Dept of Oral Surgery ,SMBT Dental College,Sangamner, <sup>5</sup> MDS oral Pathology, Lecturer ,Ghariyan Dental College ,Libya.

Corresponding Author: Prof.Dr.Mahendra Patait, 11,Ujwal, Dwarka nagari, kathe lane,nashik 422001 Maharashtra-India Email : [reetpat123@yahoo.com](mailto:reetpat123@yahoo.com)

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**Introduction**

Precise diagnosis and treatment of the oral diseases is an essential component of the patients comprehensive dental care. The dentist is in a strategic position to recognize early pathologic changes involving the oral cavity. In making a certain diagnosis evaluation of information obtained from the history, clinical examination & radiological findings are sufficient. However many diseases of oral mucosa, underlined soft tissue and bone pathology required additional information to make an accurate diagnosis. This additional information in many instances may be provided by biopsy and submission of histopathological tissue for examination to the laboratory. The purpose of this article is to outline the indication of the oral biopsy procedures and allied technique to insure the correct diagnosis.

**Clinical evaluation**

Patient history: past medical history, habits, medications, previous trauma .

Lesion history: Duration, chief complaint, change

Clinical characteristics: texture, consistency, colour, sharpness, size, shape .

What Is Biopsy<sup>1</sup> ? The word biopsy originates from the Greek terms bios(life) and ophis (vision): vision of life. A biopsy consists of the obtainment of tissue from a living organism with the purpose of examining it under the microscope in order to establish a diagnosis based on the sample. (Fig 1)

**Objectives**

- The aim of the biopsy is to:
- Define a lesion on the basis of its histopathological aspect;
- To establish a prognosis in malignant or premalignant lesions;
- Facilitate the prescription of specific treatment;
- Contribute to the assessment of the efficacy of the treatment;
- Act as a document with medico-legal value.

**Indications**

- Any lesion that persists for more than 2 weeks with no apparent cause.
- Any inflammatory lesion that does not respond to local treatment after 10 -14 days.
- Persistent hyperkeratotic changes in surface tissues.
- Any persistent tumescence, either visible or palpable beneath relatively normal tissue.
- Inflammatory changes of unknown cause that persist for long periods
- Lesions that interfere with local function.
- Any lesion that has the characteristics of malignancy.
- If in doubt- do a biopsy.

**When Is Biopsy Not Needed?**

- There is no need of biopsy in normal structures.
- There is no need of biopsy in irritative/traumatic lesions that respond to the removal of a presumed local irritant.
- There is no need of biopsy in inflammatory or

infectious lesions that respond to specific local treatments, as pericoronitis, gingivitis or periodontal abscesses.

#### Who Should Do The Biopsy?

Many lesions are encountered that do not present the obvious findings of malignancy, but do require a biopsy to establish a correct diagnosis.

An alert clinician, by the routine use of the biopsy examination for lesions he cannot recognize or which do not respond to therapy, will occasionally discover an early malignancy.

It matters little who does the biopsy as long as it is done correctly and without delay

#### Types of biopsy<sup>2</sup>

##### Depending on the characteristics of the target lesion-

direct or indirect

##### Depending on the technique employed

Incisional biopsy  
Excisional biopsy  
Punch biopsy  
Aspiration biopsy

##### Depending on the materials used -

Conventional scalpel  
Punch  
electro scalpels  
Co2 laser scalpels

##### Clinical trimming of sampling-

Intraoperative  
extra operative

##### Depending on the sampling location-

Salivary glands  
Bone  
Lymph node  
Other tissues

##### Depending on the processing of the sample -

Frozen  
Embedded in paraffin or methacrylate  
Examined under electron microscope  
Or as a fresh sample  
Molecular analysis

##### Purpose of biopsy

Diagnostic  
Experimental

##### Rules of biopsy<sup>3</sup>

- Do not delay
- Avoid distortion of the specimen
- Handle the specimen properly
- Submit a good case history

**Excisional Biopsy:** It consists of the complete removal of the entire lesion with an adequate margin of normal tissue on all sides. (Fig 2)

It is a combination of a diagnostic procedure and definitive therapy and should be reserved for lesions-

- That are surgically reasonably accessible.

- Less than 2-2.5cm in diameter and that are clinically benign

- That may be shelled out
- That are small, well-defined bony lesions

**INCISIONAL BIOPSY:** It is the removal of a small, representative, portion of the lesion for microscopic examination.

Indications include

- Large soft tissue lesions
- Diffuse lesions
- Suspected malignancies

The specimen should include the maximum volume of abnormal tissue along with adjacent normal tissue

Areas of necrosis should be avoided.

The incision should be of sufficient depth.

#### Technique Of Incisional & Excisional Biopsy<sup>4</sup> Armamentarium

Local anesthetic equipment  
Scalpel (no.15 blade)  
Scissors with pointed tips  
Fine tissue forceps  
Allis forceps  
Small hemostat  
Gauze sponges  
Needle holder  
Biopsy bottle (10% formalin)

#### Steps in technique

Anesthesia  
Tissue stabilization  
Incision  
Handling of tissue  
Specimen care  
Surgical closure

**Anesthesia:** Block local anesthesia technique is used. The local anesthetic solution is injected well away from the tumor site. The microscopical appearances of the specimen may be distorted by error unless the injections are made 2 cm away. When blocks are not possible, infiltration may be used.

**Tissue Stabilization:** Tissue stabilization is managed better if the clinician and an assistant each firmly grip the lip by placing their thumb and index finger on either side of the lesion. Another approach is to use a chalazion clamp, which reduces bleeding, tenses and stabilizes the tissue, and provides the operator with a convenient handle so that control can be maintained throughout the procedure. Heavy retraction sutures and towel clips can be used.

**Hemostasis:** Use of suction devices for aspiration of surgical hemorrhage during biopsy should be avoided. Small surgical specimens can be easily aspirated into

these devices and lost. Gauze wrapped over the tip of a low volume suction device or gauze compresses are adequate.

#### Incision:

A sharp scalpel should be used to incise tissue for biopsy.

Two incisions forming an ellipse at the surface and converging to form a V at the base of the lesion provide a good specimen.

The length of the ellipse should be 3 times the width

In excisional biopsy the initial incisions should be gauged to exceed the total depth of the lesion slightly.

In incisional biopsy the depth into the lesion that provides sufficient material for histopathological evaluation is adequate.

Deep specimens are preferable to broad, shallow specimens

An attempt should be made to keep incisions parallel to the normal course of nerves, arteries and veins.

A periphery of normal appearing tissue should be included in excisional biopsy specimens.

For benign lesions- 2-3mm of peripheral tissue is adequate.

For malignant, pigmented, vascular or with diffuse borders, 5mm of peripheral tissue is submitted.

#### Tissue Handling

Extreme care must be exercised when removing the surgical specimens.

Liberal use of tissue forceps will severely damage the tissues.

Once a tissue forcep is applied repeated releasing and replacing of the instrument should be avoided.

Use of traction suture advocated.

#### Specimen Care and Surgical Closure

After removal the tissue should be immediately placed in 10% formalin solution that should 20 times the volume of the surgical specimen.

Once the specimen is removed primary closure of the elliptic wound is usually possible.

#### Punch Biopsy<sup>5</sup>

The oral mucosal punch is a rapid, simple, safe and inexpensive technique for obtaining a representative sample of most oral zones.

It is most often used for total removal of small lesions along with partial removal of superficial abnormalities.

Extremely useful technically undemanding procedure especially when used on fixed tissue such as the firmly attached palatal tissue.

Best suited for the diagnosis of mucosal abnormalities that may require multiple biopsies.

#### Technique of Punch Biopsy

The instrument consists of a sterile and discardable punch with a plastic hand piece and cylindrical cutting blade. The latter may be 2, 3, 4, 5, or 6 to 8 mm in diameter, with stepwise increments of 0.25 a 0.50mm.

As a result, tissue cylinders 2 to 8 mm in diameter can be obtained - the most widely used calibre being 4 mm. (fig. 3) The punch is grasped between the index and thumb, supporting the cylinder over the target lesion.

#### Limitations

However, the punch is unable to remove large lesions, and cannot be used in intensely vascularized or innervated areas. It is likewise not applicable to deep lesions, and is limited to epithelial or superficial mesenchymal target tissues. Caution is moreover required when using the punch to sample lesions located over important submucosal structures such as the mental or nasopalatine foramen.

On the other hand, the instrument is difficult to use in the region of the soft palate, maxillary tuberosity or floor of the mouth, due to the lack of firm tissue fixation or support, and the mobility of the target zone

#### Aspiration Biopsy

It is the use of a needle and syringe to penetrate a lesion for aspiration of its contents.

Two main types are used-

- To determine whether or not a lesion contains fluid or air
- To remove cellular material for diagnostic examination (fine Needle aspiration) Should be carried out on all lesions thought to contain fluid or any intraosseous lesion before surgical exploration. (Fig 4)

#### Fine Needle Aspiration Biopsy<sup>6</sup>

This is another type of incisional biopsy in which a fine needle is used to remove a very small core of cells from a deep seated lesion.

Indications include-soft tissue mass detected below the surface of the skin or mucosa

- Suspected tumor of the parotid gland
- enlarged lymph nodes.

Because deep masses are difficult to diagnose, FNA biopsy is a very powerful tool.

An 18 gauge needle is connected to a 5- or 10 ml syringe.

The area is anesthetized and the needle is inserted into the depth of the mass during aspiration.

The tip of the needle may have to be repeatedly repositioned to locate a fluid center.

If unable to penetrate a bony lesion it will be necessary to reflect a flap

**Table 1 – Nature of aspirates and possible pathology**

Pathology	Aspirate	Other findings of aspirate
1) Dentigerous cyst	Clear pale, straw colored fluid	Cholesterol crystals Total protein in excess of 4g/100ml (resembling serum)
2) Odontogenic keratocyst	Dirty, creamy white viscid suspension	Parakeratinized squames Total proteins less than 5g/100ml most of which is albumin
3) Periodontal cyst	Clear, pale yellow straw coloured fluid	Varying amounts of cholesterol crystals Total protein content between 5-11g/100ml
4) Infected cyst	Pus or brownish fluid, seropurulent / sanguinopurulent fluid, at times paste like or caseous consistency	Polymorphonuclear leucocytes Foam cells Cholesterol clefts
5) Mucocele, Ranula	Mucous	
6) Gingival Cyst	Clear fluid	
7) Solitary bone cyst	Serous or sanguineous fluid, blood or empty cavity	Necrotic blood clot
8) Stafne's bone cavity	Empty cavity will yield air	
9) Dermoid cyst	Thick sebaceous material	
10) fissural cyst	Mucoid fluid	
11) Vascular cyst walls	Fresh blood	
12) Intramedullary cavernous haemangioma	Syringe full of venous blood	
13) Arterial or arteriovenous malformation	Bright red blood, pulsatile, pushes plunger	

**Exfoliative Cytology**

It is regarded as an adjunct to biopsy rather than a substitute for it.

It is indicated

(1) for screening large areas of abnormal-appearing mucosa, in order to choose the site for a biopsy in an area from which the most suspicious cells are found.

(2) as a preliminary investigation for oral cancer in a patient too nervous to allow a biopsy

(3) when diffuse or multicentric lesions have to be examined

(4) when repeated examinations have to be performed over long periods as in follow up of patients previously been treated for oral cancer

**Exfoliative Cytology**

Material is obtained by scraping the surface of the suspect area with a tongue blade or tongue depressor.

Material is spread on a clean previously label slide.

Slide is put in a jar containing equal parts of ether and 95% ethyl alcohol for 15 minutes

Fixation and staining.

Examination by pathologist for malignant cells.

**Contraindications -**

Patient with a history of coagulopathy or bleeding diathesis. Proximity of lesions to vital

anatomic,vascular neural,ductal structures. No incisional biopsies should be performed on suspected angiomatous lesions.Pigmented lesions generally should not be biopsied incisionally.

**What is the brush biopsy test?**

The brush test consists of 2 components:

A specially designed brush that a dentist uses to painlessly obtain a sample of an oral spot. The brush test requires no anesthesia, causes no pain and minimal or no bleeding.

The analysis of that sample at a specialized laboratory where specially-trained pathologists use highly sophisticated computers to help detect abnormal cells. A complete report is faxed to your dentist.

What should a dentist say to a patient who needs a brush test?

A communication with patients regarding the brush test needs to be focused on the fact that it is not a test for oral cancer but for oral precancer that is still harmless at the time of diagnosis. Patients should be informed that the vast majority of small, harmless-appearing oral spots that are evaluated by the brush test will not be found to contain any abnormal cells. It is particularly important to stress to patients that if abnormal cells are found by this test, it typically takes several years before

they can cause any harm. During this time, the abnormal spot can usually be easily and completely removed

**Indications:**

- Precancerous lesions
- Early cancers
- Harmless looking lesions.

**Contraindications:**

Highly suspicious oral lesions which should receive an immediate scalpel therapy.

**Advantages:**

- Rapid
- Chairside procedure
- No bleeding
- No topical or injectable local anesthesia required
- Easy to master
- Gives morphologic evidence of benign oral process.

**Disadvantages:**

- Required of special kit
- Costly procedure
- Not precise
- Screening test
- Required of computer assisted laboratory.

**CONCLUSION**

Given the rising incidence of oral cancer worldwide in young patients with no risk of factors the urgency of early detection has never been greater. Biopsy is a safe, simple diagnostic tool available to all members of the profession to assist them in the accurate diagnosis of the lesions. Therefore, it is crucial to examine all patients carefully in order to identify small white and red spots, which although probably normal, could

possibly be precancer or early oral cancer.

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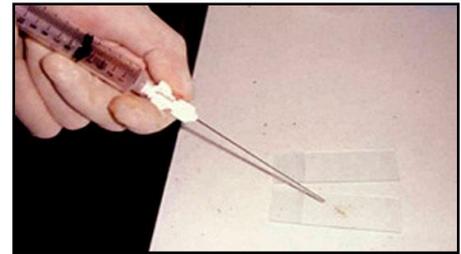
**Fig 1 – Lesion selected for biopsy.**



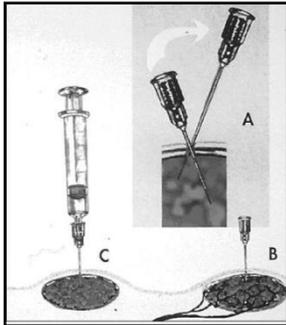
**Fig 2 – Excision of tissue for biopsy**



**Fig 3 - Punch used for biopsy examination.**



**Fig 4- Aspiration on labeled slide for**



**Fig 5 – Different gauge needle used according to site of biopsy.**



**Fig 6 - Brush test kit**



**Fig 7 - Taking sample with help of brush**



**Fig 8 – Slide Preparation in brush biopsy.**

### The technology behind the BrushTest™

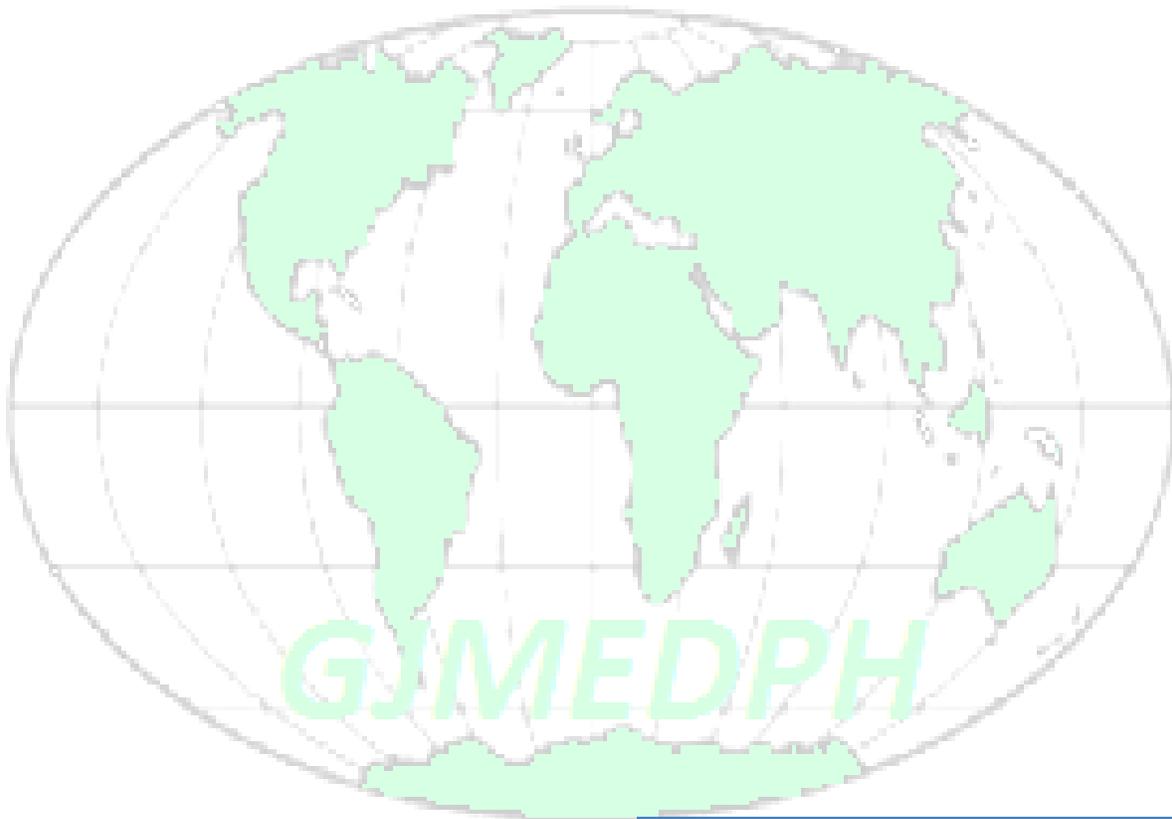


**Analysis**  
Every cell on the slide is examined by OralCDx Laboratories' patented computer scanning system.

**Diagnosis**  
Our specially-trained pathologists examine the cells and make the diagnosis.

Results will be faxed to your dentist's office.

**Fig 9 – Analysis and Diagnosis.**



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