# Review Article

## Biopsy of Oral Lesion -A Review Article

Tarun Vyas

Assistant Professor, Department of Oral Medicine and Radiology, R R Dental College & Hospital, Umarda, Udaipur, Rajasthan

*ABSTRACT:*
Biopsy is the removal of tissue from a living person for microscopic examination to confirm or to establish the diagnosis of a disease The purpose of this article is to review those skills, to discuss new developments in this area, and to highlight some of the potential pitfalls that may occur in taking a biopsy and methods available to avoid them. We feel it will be of value to both general dental practitioners and junior hospital staff. Problems related to specific areas will be covered including apical lesions and those associated with the dental hard tissues.
Key words: Biopsy , Dental hard tissues, FNAC

**Corresponding author:** Dr. Tarun Vyas, Assistant Professor, Department of Oral Medicine and Radiology, R R Dental College & Hospital, Umarda, Udaipur, Rajasthan

## INTRODUCTION:

Biopsy is the removal of tissue from a living person for microscopic examination to confirm or to establish the diagnosis of a disease.
The term was coined by Ernst Henry, a French dermatologist in 1879. This approach is used for all tissues of the body, including those of the oral cavity, where a wide spectrum of disease processes may present. Proper management of an oral mucosal lesion begins with diagnosis, and the gold standard for diagnosing disease, oral or otherwise, is tissue biopsy[2]. The oral environment, which is moist and confined, poses challenges for collecting a viable tissue sample that will be suitable for diagnosis. These challenges are further compounded by the myriad of biopsy techniques and devices now available. The dental clinician should be aware of the various biopsy techniques that are available for the oral tissues, as well as the challenges specific to these tissue. Whatever the method used, however, the aim is to provide a suitably representative sample for the clinician to interpret, while minimising preoperative discomfort for the patient. An unsuitable, unrepresentative sample is of no use to the clinician or most importantly the patient who would be ill served by an unnecessary repeat procedure (fig 1)[1].
**Rovin** has made several observations on biopsy decisions.[3]
1. Any lesion that persists for more than two weeks with no apparent  etiological basis.
2. Any inflammatory lesion that does not respond to local treatment after 10 to 14 days that is, after removing local irritant.
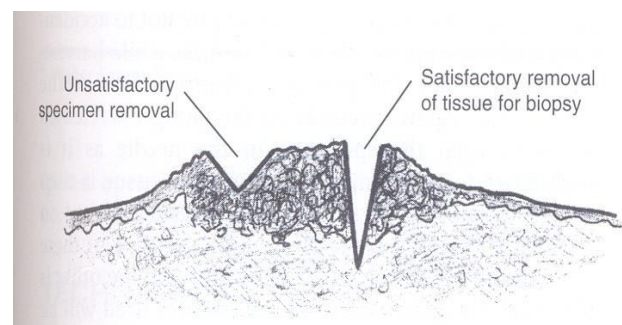


**Figure 1**

3. Persistent hyperkeratotic changes in surface tissues.
4. Any persistent tumescence either visible or palpable beneath relatively normal tissue.
5. Inflammatory changes of unknown cause, that persists for long periods.
6. Lesions that interfere with local function. Eg. Fibroma.
7. Bone lesion not superficially identified by clinical and radiographic findings.
8. Any lesion that has characteristics of malignancy.
- Erythroplasia: Lesion is totally red or has a speckled red and white appearance.
- Ulceration: an ulcerated lesion
- Duration: Lesion has persisted more than 2 weeks.
- Growth rate: Lesion exhibits rapid growth.
- Bleeding: Lesion bleed on gentle manipulation.
- Induration: Lesion and surrounding tissue is firm to touch.

- Fixation: Lesion feels attached to adjacent structures.

9. To determine the nature of lesion which does not readily respond to conservative and simple therapy.

10. To establish the diagnosis where there is suspicion of neoplasia.

11. To determine the nature of all abnormal tissue removed from the oral cavity including cysts and granulomas.

## CONTRAINDICATIONS:

There is no absolute contraindication for biopsy but relative contraindications are as follows :

- Normal anatomic and racial variation such as those seen in physiologic pigmentations, leukoedema, linea alba, tori, exostosis and others.
- Compromised general health of the patient or a history of diathesis, including patient on anticoagulant therapy.
- Proximity of lesions to vital anatomic vascular, neural or ductal structure and lesions in areas of difficult surgical access.

Immediate pre or post radiation therapy.

## Various types of biopsies are as follows[3]-

1. Incisional Biopsy
2. Excisional Biopsy
3. Exploratory Biopsy
4. Punch Biopsy
5. Curettage Biopsy
6. Unplanned Biopsy
7. Needle Biopsy
8. Imprint Cytology
9. Shave Biopsy
10. Fine Needle Cutting Biopsy
11. Exfoliative cytology

## 1. Incisional Biopsy:

An incisional biopsy is a technique that samples only a particular or representative part of the lesion. If the lesion is large or has different characteristics at different locations more than one area of the lesion may need to be sampled by this technique usually indicated if the area under investigation appears difficult to excise because of its extensive size (>1cm in diameter) or hazardous location or whenever there is suspicion of malignancy[.4]

### Principles:

Representative areas of the lesion should be biopsied in wedge fashion. The biopsy site should be selected in an area that shows maximum tissue changes. Necrotic tissue should be avoided, as it is useless in diagnosis. The material should be taken from the edge of the lesion to include normal tissue. Care must be taken to include an adequate amount of abnormal tissue. It is better to take a deep, narrow biopsy, rather than a broad, shallow one, because superficial changes may be quite different from those deeper in the tissue.(fig.2)

In incisional biopsy a pie shaped or elliptical wedge is removed. The incision on either side of the ellipse converges in a V to join in deeper sublesion tissue. In either instance a margin of normal tissue of at least 2-

3mm is required, except for the pigmented or vascular lesions, rapidly growing lesions with ill defined borders which require margins of 5mm normal tissue. The length of the ellipse should be three times the width in all these instances, to assist in tissue closure and minimizing the possibility of wound dehiscence.
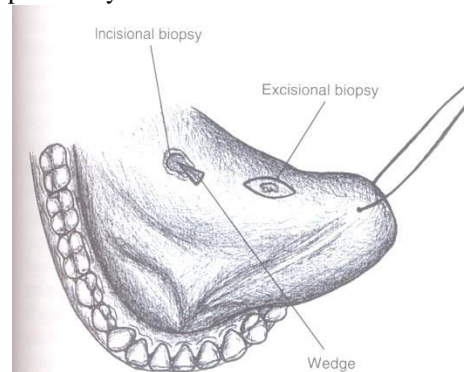


**Fig.2**

## 2. Excisional Biopsy:

It implies removal of the entire lesion at the time the surgical diagnostic procedure is performed. A perimeter of normal tissue surrounding the lesion is also excised to ensure total removal.[5]

### Indications:

Excisional biopsy should be employed with smaller lesions (<1cm in diameter) that on clinical examination appear to be benign.

Any lesion that can be removed completely without mutilating the patient is best treated by excisional biopsy. Pigmented and small vascular lesions should also be removed in their entirety.(fig.2)

### Principle:

The entire lesion, along with 2-3mm of normal appearing surrounding tissue is excised.

### 3. Exploratory Biopsy:

It is done for the investigation of an internal lesion. In this the removal of all portions of tissue exposed is done. This is commonly employed for the intra osseous lesion of mandible and maxilla.

### 4. Punch Biopsy:

It can be either an incisional or excisional, but usually a variant of an incisional biopsy, which uses a special punch type forceps for the removal of a portion of the lesion.[6]

In this method the surgical instrument files out small segments of tissue from inaccessible lesion or from large lesion where excision is contraindicated. Since, distortion of the lesion is often encountered with this instrument; this method is rarely used in the oral cavity.

### Principle:

In this method, the punch is held perpendicular to the skin and gently rotated with firm downward pressure. The punch is pushed down until the subcutaneous fat is reached. The incised column of tissue in the punch is lifted and the pedicle is cut. The tissue is then carefully removed from the punch.(fig 3)[7]

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**Fig.3**
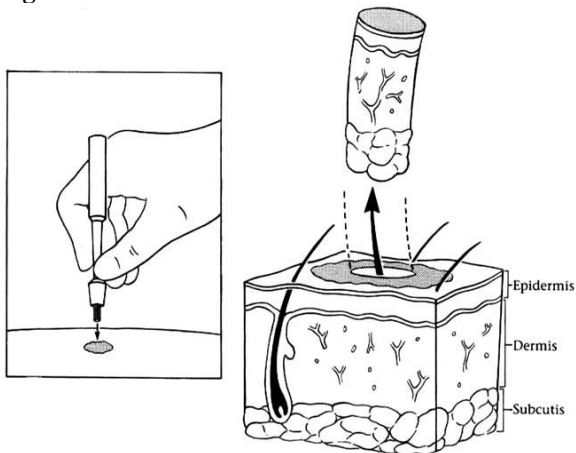


### 5. Curettage Biopsy:

It is used primarily for intra osseous lesion and very friable cellular lesions, where only small amounts of surface material are necessary for evaluation.

Extremely small tissues are centrifuged and the sedimentary segments are placed in agar media and are then sectioned as tissue blocks. This can be used successfully on lesions like Actinic keratosis, superficial squamous cell carcinoma, superficial basal cell carcinoma and Warts, not helpful for inflammatory dermatoses and pigmented lesions.

### 6. Unplanned Biopsy:

It is the result of a surgical procedure, where suspicious tissue is obtained unexpectedly.

### 7. Needle Biopsy:

Technically it is an incisional/punch biopsy and is used mainly for obtaining materials from deep seated lesions such as from within the bone or from an inaccessible location.

### 8. Imprint Cytology:

In this technique, the biopsied tissue is cut in to two halves and the cut surface is touched to the slide and the slide is stained later to see the exfoliated cells.

### 9. Shave Biopsy:

When a lesion is raised, a shave biopsy can be obtained for selected lesions using either a scalp blade or a double edge razor blade, the lesion is cut fresh with the surrounding skin(fig.4).Excessive traction on an exophytic lesion must be avoided, as this may result in depression at biopsy site, which can be permanent. This technique provides specimens that are less deep, and wound often heals with less obvious cosmetic defects. This type of biopsy is indicated for:

- Benign exophytic lesions
- Superficial inflammatory lesions.

It is contraindicated in suspected melanomas



Fig 4.

### 10. Fine Needle Cutting Biopsy:

Here a 12 or 16- gauge needles with a trocar are used to obtain cores of tissue. Such a tissue is examined by routine histological methods[8]

**Advantages**:

- It is a simple out patient procedure associated with a minimal infection risk and rapid healing.
- It is well tolerated by patients many of whom had already experienced major head and neck surgeries.
- This technique may allow surgeon to obtain tissue for histological diagnosis limited to a surgical biopsy.
- Its advantage over FNAC is that interpretation of the results is easier for most practicing pathologists who have limited experience of cytopathology.

**Disadvantages**:

- False negative reports.
- Possible tumor dissemination.

**Indications**:

- The main clinical indication for using FNCB in head and neck surgery is to distinguish between reactive changes and recurrent malignancy. Conformation by FNCB of a cervical metastasis from a previously treated oral carcinoma does not prejudice the success of subsequent surgery in the way that a surgical biopsy may do.
- It may also be used for the initial investigation of an isolated symptomless swelling in the neck which could be inflammatory or neoplastic.
- Its use in initial investigation of salivary gland swellings is more controversial but the evidence from the literature suggests the risk of tumor dissemination is minimal.
- It is helpful in the management of salivary gland tumors to know prior to surgery whether, for example, the tumor is a pleomorphic adenoma or a malignant salivary gland tumor.

### 11. Exfoliative cytology

- Exfoliative cytology is the microscopic study of cells obtained from the surface of an organ or lesion after suitable staining.

- The neoplastic cells are less cohesive than the other normal cells and usually they shed on the surface of the lesion or into secretion.
- The shed neoplastic cells are obtained from the lesion by scrapping its surface and are then evaluated for possible changes like dysplasia.(fig.5)[9]

### Technique:
- Firstly all the surface of lesion is cleaned by removing all the debris and mucins etc.
- After that, gentle scrapping is done on the surface of the lesion with metal cement spatula or a moistened tongue blade for several times.
- Thus the materials present on the surface of the lesion are adhered or collected at border of the instrument.
- The collected material is then evenly spread over a microscopic slide and is fixed immediately with either 95% alcohol.
- The slide is then air dried and is stained by a special stain called PAP stain (papanicolaou stain)

### Indications:
Exfoliative cytology can be helpful for the diagnosis of the following oral lesions:
-Herpes Simplex
-Herpes Zoster
-Pemphigus Vulgaris
-Pemphigoid
-Squamous Cell Carcinoma
-Aphthous Ulcer
-Candidiasis

### Advantages:
- Anaesthesia is not required in this technique and it is most useful for detection of virally infected cells, acantholytic cells and candidal hyphae etc.
- It is quick, simple ,painless and bloodless procedure.
- Special procedures like immunohistochemistry can be performed in exfoliative cytology samples.

### Disadvantages:
- It is unreliable for confirmatory diagnosis of cancers as large numbers of false negative test results are often found.



**Fig.5**

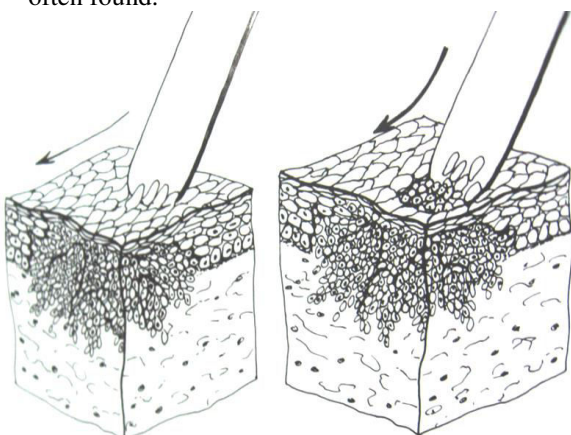### The minimal requirements are as follows-
- Blade Handle and No. 15 Blade
- Fine Tissue Forceps (Preferably Adson Forceps)
- Syringe and Local Anesthetic
- Retractor appropriate for the site
- Sutures, If needed
- Needle holder
- Curved Scissors
- Hemostatic Agents
  -(Silver Nitrate Or Absorbable gelatin sponge)
- Gauze Sponges
- Specimen Bottle Containing 10% Neutral buffered formalin
- Biopsy Data Sheet



**Fig.6**

The biopsy techniques will be described according to anatomic locations[1].

### Lip:
Indications for biopsy of lip ussualy involve differential diagnosis of nodules and ulcers followed by mucosal lesions.

**Excisional Biopsy:** This is indicated for small, benign, well-circumscribed lesions of the lip. For surgical purposes, the lip is divided into three segments: the cutaneous portion, the vermilion, and the mucosal portion. The lips contribute highly to facial aesthetics and to emotional gratification, hence the incisions for a biopsy should be planned to avoid or minimize disfiguring of the appearance of the lip.

**Cutaneous Biopsy:** For lesions totally confined to the cutaneous portion of the lip, the incision for the biopsy should be planned to follow the natural facial creases and should be elliptical in shape. Elliptical excisions made parallel to or along these normal creases and folds of the lip will heal with a minimum of scar tissue. The general rule is that the length of the incision should be three times the diameter of the lesion at its widest point to permit tension-free closure of the skin. In areas where the skin can easily be undermined, a little shorter incision may be used so as to minimize the scar. Skin should be closed with 5-0 nylon on a cutting edge needle.

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**Vermilion Border:** When excising a mass from the vermilion portion of the lip every attempt should be made to avoid reducing the bulk of vermilion. To achieve this objective, vertical incisions should be used. The wedge resection may be used to excise benign tumours from the lip. The length of the wedge should be one and one-half the width of the wedge. Up to one third of the lip may be removed with primary repair that will be aesthetic. The wedge may be directed toward the skin or toward the mucosa, depending on where the mass is located. Meticulous repair of the vermilion border is essential. When closing an excision site the first suture should be placed to accurately reapproximate the vermilion border. The second suture should approximate the wet-dry line where there is a natural colour change from the vermilion colour to the mucosal colour. The wound closure can then be completed with interrupted sutures. If the wedge is directed intraorally, then the first suture should approximate the wet-dry line where the colour change occurs.

**Labial Mucosa:**

Small lesions can be excised using an elliptical incision with its long axis perpendicular to the vermilion. Larger ones should be done with a horizontal incision. The general rule of length being three times the diameter should be followed. Branches of the mental nerve are frequently encountered in this area. They can usually be seen not far below the surface of the buccal mucosa travelling within the muscle. In the excision of small nodules, an attempt should be made to spare these nerve fibres. However their presence should not compromise the removal of pathology as these nerves will regenerate.(fig.7)
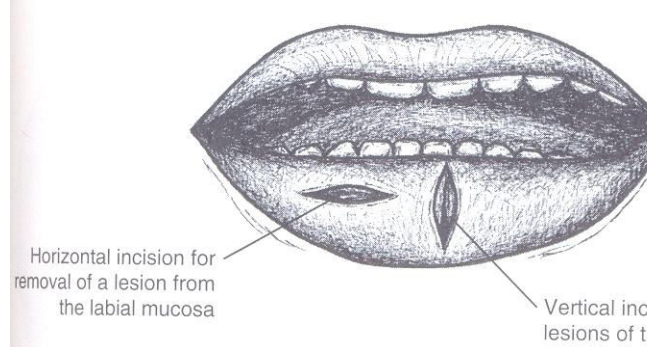


**Fig. 7**

**Incisional Biopsy:** On the lips this type of biopsy is indicated for the following:

- Large lesions that will require. extensive reconstruction
- Diffused lesions
- Ulcerated lesions that are suspicious for malignancy

Careful examination of the lesion should be done, and a site that best represents the pathology should be selected for biopsy. An adequate sample of abnormal tissue should be taken, and the tissue should be "Large" (5 x 5 mm). In suspected squamous cell carcinoma, the wound should not be closed unless sutures are needed to apply pressure to control bleeding.

**Buccal Mucosa:**
Indications of biopsies of buccal mucosa are most frequently the mucosal lesions followed by nodules and ulcers.

**Excisional Biopsy:** The direction of the incision will depend on whether the mass is located anteriorly to the orifice of Stensen's duct (the parotid papilla) or behind it and on the depth and size of the mass.(fig 8)
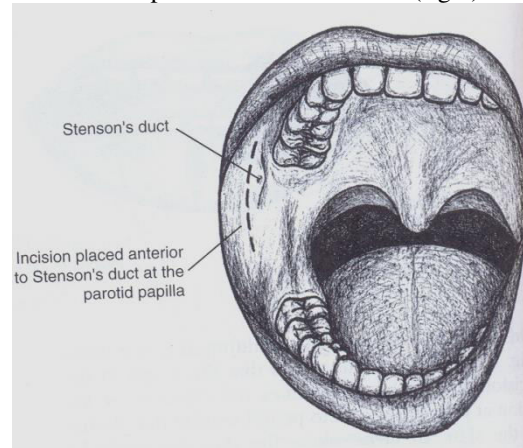


Fig. 8

For a mass located anterior to the orifice and deep to the mucosa a vertical incision is made and the mass is dissected and brought forward. Small sessile or pedunculated masses can be removed with a vertically oriented ellipse. Horizontal incisions tend to stretch and dehisce when the mouth is opened wide, whereas vertical incisions tend to relax when the mouth is closed, and re-stretch to the surgical size on opening.

At or behind the parotid papilla, the ellipse should be horizontally oriented so as to avoid possible injury to the duct. In the third molar area, a vertical incision extending beyond the occlusal plane would expose the buccal fat pad, allowing it to descend into the field. This may compromise the visibility and possibly the biopsy.

**Incisional Biopsy:** Large lesions are sampled by wedge incision, sampling of multiple areas should be considered if lesions persists with various clinical features.

**Tongue:**
Indications for biopsies of buccal mucosa involves ulcers, nodules followed by mucosal lesions.
Biopsy of the lateral border and dorsum of the tongue are anatomically safe procedures. The ventral aspect of the tongue has a wide distribution of veins that may be injured during biopsy. The surgeon should be prepared to clamp, possibly ligate, and/or control bleeding from these veins.

**Excisional Biopsy:** This is usually achieved by elliptical incisions on both the dorsum and lateral borders of the tongue. Following local anaesthesia, a half circle cutting edge needle is passed through the tongue carrying a #0 silk suture. The suture is passed from the dorsal surface in the middle third halfway between the median raphe and the lateral border, through to the ventral surface, across to the opposite side of the ventral surface and back up

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through the tongue to the dorsal side. This type of retraction suture may be used to retract the tongue and may be tightened to control small bleeds. There is a risk, however, of injuring veins on the ventral surface of the tongue with this technique. A simpler, safer method is to place one or two sutures in the anterior third.(fig.9)
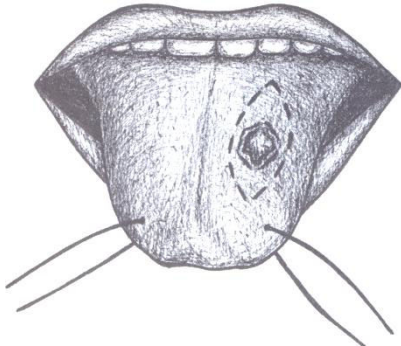


**Fig.9**

**Incisional Biopsy:** This should be done for deep large lesions in the tongue, and suspicious lesions (malignancies) of the lateral border.

**Palate:**
The most common lesions submitted for microscopic diagnosis from the palate were: hyperkeratosis, benign swellings and rarely nodules and ulcers.
The palate has two distinct anatomic portions. The posterior third is the movable, muscular, soft portion that terminates in the uvula; and the anterior two thirds is the non-movable, bony, glandular hard palate. Because of the gag reflex, the possible need for a Dingman mouth prop, possible bleeding into the nasopharynx, and patient anxiety, biopsy of the soft palate may be difficult and often requires general anaesthesia with intubation of the trachea. Surgery of the soft palate, .Therefore, should be performed by an experienced surgeon.
Biopsy of lesions of the hard palate is a minor oral surgical procedure. Anatomic consideration of the hard palate is limited to the greater palatine vessels. Several different morphologic tissue types are found in the hard palate, and tumours and diseases may arise from any of these different structures.

**Excisional Biopsy:** On the palate this should be reserved for small (<2 cm in diameter) masses or ulcerations with a well-demarcated border. When this is done, the planned excision should include 1/8 of an inch (5 mm) of normal tissue around the lesion. Lesions that extend to bone should include the underlying periosteum in the excised specimen. The resultant surgical defect does not require primary closure.
Microfibrillar collagen, a dressing of absorbable collagen, or Gel-foam may be used to control bleeding and left to cover the wound. The patient should avoid eating spicy foods for a week to 10 days. Hot liquids should also not be used for the first 3 to 5 days. Although these wounds are generally not very painful, the surgeon should be aware that a patient who is not in pain tends to heal

better, and it is therefore prudent to minimize any postoperative discomfort that the patient may suffer. To achieve this goal, topical agents should be used in addition to systemic analgesics.
For larger defects a surgical splint made from a soft vacuum-forming material on a vacuum-forming machine or acrylic, should be fabricated preoperatively from a dental model, and used to cover the wound. This will prevent the patient from irritating the area with the tongue, and will make eating more comfortable. If the wound is covered, however, it should be examined every 3 days by the surgeon. The patient should be advised to wash the splint two to three times per day, and not to sleep with it in place. Placing a surgical splint tends to trap exudates, and keep them trapped against the open-wound. This may slow the healing process, cause infections, and increase scarring.

**Incisional Biopsy:** This is indicated for large (> 2 x2 cm) or ominous looking lesions, diffused ones, or where the clinician is unsure of the diagnosis. (All accurate diagnosis will result in the best treatment, so the surgeon should take the effort to properly identify the disease entity by a biopsy). The specimen should be taken from an area that will give the best sample of abnormal tissue. The piece removed may be rectangular or triangular in shape.
Incisional biopsy of salivary gland tumours requires special discussion. These tumours are considered *encapsulated*. Because of this, the biopsy should be done at the center of the lesion and not at the periphery. Performing the biopsy at the periphery will violate the capsule and allow the tumour to spread into the adjacent tissue. Taking the specimen from the center will maintain the capsule, and minimize the surgical border that will be needed at the time of definitive surgery.

**Floor of Mouth:**
The most frequently submitted specimens from the floor of the mouth were: ulcers and nodules followed by mucosal lesions.

**Anatomic Considerations:** The floor of the mouth contains important anatomic structures with which the surgeon should be familiar. Excisional or incisional biopsy in the floor of the mouth should be carefully planned so as not to damage vital structures. The significant ones are the duct of the submandibular gland (Wharton's duct), the lingual nerve, and the sublingual artery.

**Wharton's Duct:** This structure enters the floor of the mouth in the region of the mandibular third molar medially, and close to the tongue. It first courses deep in the floor of the mouth along the upper surface of the mylohyoid muscle. Becoming more superficial, it crosses over the lingual nerve, and continues anteriorly on the under surface of the sublingual gland. It opens into the mouth at the sublingual caruncula within a few millimetres of the lingual frenum. From the premolar forward the submandibular duct is midway between the base of the tongue and the alveolar ridge. Anteriorly, the

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duct widens and is superficial. The submandibular duct is a fairly large structure and is very easily identifiable below the lingual mucosa in the anterior portion of the mouth.

Behind the premolars the duct is deep and is situated below the sublingual gland, thus the chances of cutting into it during a mucosal biopsy are greatly decreased. From the premolar forward, however, the likelihood of injury during a biopsy increases as the duct is now more superficial. Mucosal biopsy done in the anterior portion of the floor of the mouth is at high risk to injure the duct. Because of this reason, the duct should be cannulated during the biopsy. This will allow the surgeon to be aware of the location of the duct during the procedure, and will also permit instant repair in case the duct is transected. If the duct is cut along its length, it need not be repaired primarily. The wound edges of the mucosa are sutured over the duct and recanalization will occur without further intervention. Transection of the duct will require an anastomosis, or a sialodochoplasty may be performed.

Cannulation of the submandibular duct is performed with lacrimal probes. The double ended, 5-inch, silver, lacrimal probes are ideal for this procedure. Sizes 3/0 to 4/0 through to 2/0 should be available. A 2 x 2 gauze is used to dry the floor of the mouth. The operator identifies the orifice of Wharton's duct by milking the submandibular gland anteriorly and observing the flow of saliva from the duct. Starting with the 4/0 probe the operator introduces the probe into the duct. Keeping the eyes on the duct, the operator removes the first probe and immediately introduces the 2/0 end of the next probe. For a biopsy the dilation may stop at 1/0. This probe is left in the duct during the biopsy.(fig.10)
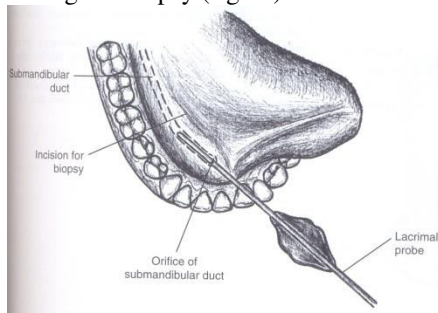


**Fig.10**

**Lingual Nerve:** The lingual nerve descends from the pterygomandibular space to enter the oral cavity in the vicinity of the mandibular third molar teeth. Here it turns anteriorly into the floor of the mouth and is superficially located at the level of the third molar. A little further anteriorly (second/first molar area) the nerve is in close proximity to the posterior border of the sublingual gland. The nerve then turns medially, passing underneath the submandibular duct, to divide into a variable number of branches that enter the substance of the tongue.

The lingual nerve is superficial in the posterior portion of the mouth and injury is most likely to occur in the third molar area. Incisions for a biopsy at this area should be medial and close to the tongue.

**Sublingual Artery:** This is a branch of the lingual artery that is situated in the floor of the mouth, at the base of the tongue, medial to the sublingual gland and Wharton's duct. In the region of the first molar-premolar area the sublingual artery is of considerable volume. Injury to the artery at this location may produce haemorrhage that may be a serious incident. Local clamping of the artery should be attempted, but this is sometimes difficult. Pressure is often the most successful method to control bleeding here. Pressure is applied by packing the area with gauze and by the surgeon applying the pressure bimanually. Constant pressure should be maintained for about 3 to 5 minutes, though longer periods may be required. If attempts to stop the bleeding at the place of injury fail, the pressure should be maintained and the patient rushed to a hospital for ligation of the lingual artery.

It must be mentioned, however, that the sublingual artery is sometimes only a small insignificant branch of the lingual artery and may even be missing. In such cases it is replaced by branches of the submental artery, which is a branch of the facial artery. When this is the case, ligating the lingual artery will obviously not stop the bleeding. Vessel ligation, therefore, should be at-tempted only after all attempts at control by pressure have been exhausted, and it should be done in the controlled environs of the operating room. Angiography may be required to identify the bleeding vessel and its origins.

**Excisional Biopsy:** This should be confined to small pedunculated lesions, or to small white or red lesions in the anterior floor of the mouth. In the midline of the floor of the mouth the incision for the biopsy may be oriented vertically between the openings of Wharton's duct if they are widely separated. In all other locations the incision should be parallel to the body of the mandible. This would avoid total transection of vital structures.

**Incisional Biopsy:** This is most often done for hyperkeratotic or ulcerated lesions. The surgeon should use experience and common sense in deciding how deep to take the biopsy. The operator should make sure that the sample that is removed is adequate to provide the pathologist with sufficient abnormal tissue to be able to make a good microscopic diagnosis.

**Bone:**

The tissue specimens from the jaws most frequently submitted are radicular and dentigerous cysts, keratocysts, fibroosseous lesions, odontomas and ameloblastomas.

Before a bone biopsy is performed, the surgeon should obtain good-quality imaging studies. If a full mouth series of periapical radiographs has been done, they should be supplemented with a panoramic radiograph of the jaws. The entire extent of the lesion must be visible along with its approximation to vital anatomic structures (teeth, nasal cavity, maxillary sinus, and inferior alveolar canal). If expansion of the buccal and/or lingual cortical plate was noted on the clinical examination, occlusal radiographs should also be taken. In rare instances CT scans or an

MRI may be requested before the biopsy, but usually the panoramic radiograph will provide enough information to arrive at a working diagnosis, locate the lesion, and to plan the biopsy. A CT scan Eg. DentaScan may sometimes be necessary when planning .The definitive treatment. A carefully formulated working diagnosis is important, because serious problems may be encountered by unsuspecting clinicians who may find themselves well into a surgical procedure that they were not prepared to handle.

**Radiolucencies:** The clinician should first determine the nature of the radiolucency. Obvious periapical pathoses need not be subjected to biopsy. Other radiolucent lesions, particularly those that are not associated with teeth that are removed from the jaws must be submitted for microscopic examination. Small radiolucent lesions that have a well-demarcated border may be enucleated in total. The procedure is similar to that used for cystectomy. Central granulomatous lesions not associated with periapical pathology should be submitted for microscopic examination before definitive treatment is instituted. Large radiolucencies should first be biopsied, and a diagnosis established before a definitive treatment.

The sequelae of opening into an unsuspected vascular tumour are very serious, and will result in severe morbidity. Because the consequence of such a surgical misadventure is calamitous, it is prudent that all radiolucencies of the jaw be aspirated as the first step in developing a working diagnosis. Vascular lesions should always be ruled out.

**Aspirational Biopsy:** A 16-gauge needle attached to a 10-cc disposable syringe is used to penetrate into the radiolucency. Negative pressure is applied to the syringe, and the contents of the radiolucent lesion removed. Aspiration may be nothing (a solid mass), air (traumatic bone cyst), straw-coloured or blood-tinged fluid (cyst, ameloblastoma), fluid with keratin needles (odontogenic keratocysts), or blood (a vascular lesion). If the cortex is dense and the 16-gauge needle cannot .penetrate into the underlying lesion, a sulcular incision is made, a mucoperiosteal flap reflected, and a hole is drilled through the cortex into the radiolucency. The aspirating syringe with an IS-gauge needle can now be placed into the lesion and a sample of its contents removed.

In a high-pressure vascular lesion, the syringe will fill with blood with very little negative pressure. The blood from a vascular lesion will be obviously red. At times however, blood-tinged fluid may be aspirated from nonvascular lesions that may be mistaken for blood. This is because bleeding occurred into the lesion as a result of the trauma from the aspirating device penetrating the bone. Rubbing the fluid between gloved fingers is sometimes useful in determining that the fluid is not blood, but mucoid in nature. If in doubt, the lesion should be aspirated a second time. The liquid from a cystic lesion will be decreased or absent, whereas true vascular lesions would refill and give a second positive aspirant to about the same volume as the first. Any suspected

vascular lesion should be aspirated twice to confirm its presence.

A negative return means that the lesion is either a solid mass or an empty cavity.

**Biopsy Technique:** Using a sulcular incision, reflect a mucoperiosteal flap. If the cortical plate is thin, with or without fenestration, then the periosteal elevator or a curette can be used to peel away the thinned cortex to expose the underlying pathology. If the cortical bone is intact and thick, a #6 or #8 round bur should be used to make a window through the cortex to expose the underlying pathology. The size of the window should be large enough to accomplish the goal of the biopsy. If the lesion will be enucleated in total (an excisional biopsy), then the window should permit access to the total lesion. For an incisional biopsy, a smaller window is satisfactory. A representative sample of adequate size should be removed.

**Multiloculated Lesions:** These bony lesions should also be aspirated to rule out a vascular lesion. Once the surgeon has ruled out vascular lesions, a specimen may be obtained through a- bony window. Minimum aise of the sample should be 5 x 5 mm.

**Radiopacities:** The well-defined radiopaque lesion (eg: an odontoma) may be removed in toto as excisional biopsy. To do this, a round bur in a high speed handpiece is used under generous irrigation, to make a bony window to expose the
pathology, which may then be enucleated.

**Incisional Biopsy:** An intact block of bone should be removed; this may be achieved with rotary instruments or with chisels. If a rotary instrument is used, a 5 mm dental latch type trephine may be used to remove a core or a fissure bur in combination with a. chisel or bone curette may be used to remove an intact block.

The dental drill with a small fissure bur is used to outline the block. The block may then be removed by the bone curette or by a chisel. Small chisels may also be used to elegantly outline and remove the block of bone. The block that is removed should be at least 7 to 10 mm x 7 to 10 mm in size, and should go deep into the lesion.

Bony specimens will require decalcification and the surgeon should not expect results for 10-14 days.

**Apical lesions and those associated with the dental hard tissues:**
Many apical lesions are submitted routinely from general dental practice as well as hospitals following periradicular surgery. The majority of the lesions are inflammatory in origin, most commonly periapical granulomas or radicular cysts. Less commonly, other odontogenic cysts present at the apex, namely nasopalatine duct cyst or of greater significance the odontogenic keratocyst. Less frequently still, odontogenic tumours may present at such a site. Bone lesions such as Langerhans cell histiocytosis, giant cell granuloma and

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myeloma may also present in this way. Rarely, malignant metastatic deposits or even intraosseous squamous cell carcinoma can occur at this site. The value of routinely examining apical lesions has recently been questioned, However, the resulting correspondence has all been strongly in support of submitting material; one respondent cited that the non-submission of material often leads to a failure to diagnose and the situation regarding periapical lesions is no different, no matter how rare such instances occur.

For diagnosis, the excised material needs to be fixed to stop tissue autolysis prior to the sample reaching the pathology laboratory. The solution of choice to do this is 10% neutral buffered formalin fixative (a 4% solution of formaldehyde).As with most other tissues submitted for routine examination, teeth should also be submitted in 10% neutral buffered formalin fixative. A mineralised sample, such as bone or tooth may require decalcification before it can be processed. The time for the decalcification will vary according to the size and consistency of the specimen as well as the methods employed by a particular laboratory, but it should be borne in mind that it can be a matter of weeks before a histopathology report is available.

## Conclusion

- When considering biopsy a little forward planning and thought can greatly improve the diagnostic value obtained.
- Biopsies of different tissue types and sites require specific techniques.
- The chosen site for a mucosal biopsy is dependent upon the disease/lesion.
- Careful handling of the tissue and prompt appropriate fixation will enable a confident histological diagnosis to be reached.
- Inadequate care at any stage could result in a non-diagnostic biopsy and may necessitate the patient having a repeat procedure with its ensuing physical and psychological morbidity.
- Written consent is advised for all biopsies.

More than proper surgical technique is required to facilitate the proper diagnosis of an oral biopsy specimen. The proper orientation of the tissue for microscopic analysis depends on steps taken by the surgeon, assistant, and technician to reduce the inclusion of artefacts. There are many ways that the exact interpretation of tissues specimens can be compromised. Unfortunately, many surgeons seem to be unaware of the extent of this problem as well as how easily artefacts can be prevented.

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