Biopsy (Principles and techniques)

Oral and maxillofacial pathology is a branch of dentistry which deals with the nature, identification, and management of diseases affecting the oral and maxillofacial regions. It is the science that investigates the causes, processes and effects of these diseases.

**Surgical Pathology**

Is that specialty of pathology which deals with the diagnosis of diseases by microscopically examination of the tissues taking by a surgeon (Biopsy).

**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.

**Types of biopsy according to the size of tissue that to be biopsied:**

1- **Incisional biopsy:** is the removal of a representative sample of the lesion and normal adjacent tissue in order to make a definitive diagnosis before treatment.
2- **Excisional biopsy:** is the complete surgical removal of the lesion for diagnostic and therapeutic purposes. This procedure is elective when the size and location of the lesion allows for a complete removal of the lesion and a wide margin of surrounding healthy tissue.

**Indications for Biopsy**

1. Any lesion that persist for more than 2 weeks with no apparent etiologic basis.
2. Any inflammatory lesion that does not respond to local treatment after 10-14 days.
3. Persistent hyperkeratotic changes in surface tissue.
4. Any persistent tumesence, either visible or palpable beneath relatively normal tissue
5. Inflammatory changes of unknown cause that persist for long periods.
6. Lesion that interfere with local function.
7. Bone lesions not specifically identified by clinical and radiographic findings.
8. Any lesion that has the characteristics of malignancy
Contraindications for Biopsy

- Significant hemorrhage may accompany biopsy of a vascular lesion, and caution should be of any lesion with red, purple or blue coloration or with blanching or pulsation on palpation.
- Location of the lesion in an esthetic region (e.g., vermilion border of the lip) is not a strict contraindication, but referral to a specialist should be considered in such cases.
- Oral subsites, such as the floor of the mouth, may be challenging to access, difficult to provide hemostasis and risks damage to anatomic structures (e.g., submandibular duct).
- It is unwise to proceed if one is uncomfortable with either the surgical procedure or the prospect of relaying devastating results to the patient.

Characteristics of lesions that raise the suspicion of malignancy

A. Erythroplasia-lesion is totally red or has speckled red appearance.
B. Ulceration-lesion is ulcerated or present as an ulcer.
C. Growth rate-lesion exhibits rapid growth.
D. Bleeding-lesion bleeds on gentle manipulation.
E. Indurations-lesion and surrounding tissue is firm to the touch.
F. Fixation-lesion feels attached to adjacent structures.
general rules for the biopsy procedure

1. The larger the lesion, more numerous biopsies should be taken from it because of the variability in pattern and the diagnostic areas may be present only focally.

2. In ulcerated tumors, biopsy of the central ulcerated area may show only necrosis and inflammation. The most informative biopsy is likely to be one taken from the periphery that includes both normal and diseased tissue.

3. The biopsy should be deep enough that the relationship between tumor and stroma can be properly assessed.

4. Deeply seated lesions are sometimes accompanied by a prominent peripheral tissue reaction, which may be characterized by chronic inflammation, hyperemia, fibrosis, calcification, and metaplastic bone formation.

5. When several fragments of tissue are obtained, they should all be sent to the pathology department and all of them submitted for microscopic examination. Sometimes the smaller or grossly less impressive fragment is the only one that contains the diagnostic elements.

6. Crushing or squeezing of the tissue with forceps at the time of performance of the biopsy by the surgeon, at the time of the gross examination by the pathologist or at the time of embedding by the histotechnologist should be carefully avoided.
Punch Biopsy

Punch biopsy may be used for either incisional biopsy or excision of a small lesion at an accessible site. The lateral tongue and buccal mucosa are appropriate sites for punch biopsy, as it must be feasible for the device to approach the mucosal surface perpendicularly. The punch is placed on the lesional tissue, and a downward, twisting motion is applied. The tissue core is then severed at the base with curved scissors.

Punch biopsy is not appropriate for vesiculobullous diseases, as the twisting action would detach the epithelium and prevent proper assessment of the interface between epithelium and connective tissue that is necessary for subclassification of such lesions.

Electrosurgery and Laser Biopsy

Electrosurgery and laser techniques produce thermal artifacts that may hamper histologic interpretation; accordingly, these methods should be used with caution for diagnostic biopsy or when information from the margins is required.
Lasers may be of great value, however, in managing a wound left by scalpel biopsy in areas of the mouth where closure is difficult or inappropriate.

Widespread, thick leukoplakia affecting the floor of the mouth and the mandibular gingiva is excised with a laser to help minimize hemorrhage and discomfort.

**Oral Cytology**

As a diagnostic procedure used to investigate lumps or masses. In this technique, a thin (23-25 gauge), hollow needle is inserted into the mass for sampling of cells that, after being stained, will be examined under a microscope. A needle aspiration Cytology is safer and less traumatic than an open surgical biopsy, and significant complications are usually rare, depending on the body site.
Exfoliative cytology
Is a quick, simple procedure, and an important alternative to biopsy in certain situations. In Exfoliative cytology, cells shed from body surfaces, such as the inside of the mouth, are collected and examined.

Brush Biopsy
Is a non-invasive method of determining the presence of cellular atypia, and hence the likelihood of oral epithelial dysplasia. Diagnosis of oral epithelial dysplasia has traditionally been based upon histopathological evaluation of a full thickness biopsy specimen from lesional tissue. It has recently been proposed that cytological examination of “brush biopsy” samples is a noninvasive method of determining the presence of cellular atypia, and hence the likelihood of oral epithelial dysplasia.