**Oral Medicine / lecture #3**

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**Biopsy**: removal of a small piece of tissue from the living body for the purpose of diagnostic microscopic examination.

The opposite of biopsy = autopsy which means **examination of dead body.**

**Indications:**

1. Lesions that has neoplastic or premalignant features, ex: white and red lesions , leukoplakia/ erythroplakia .
2. Persistent lesion of uncertain etiology.
3. Persistent lesion failing to respond to treatment.
4. Persistent focal lesion involving gingival, periodontium.
5. Conformation of clinical diagnosis.
6. Lesions causing patients concern, ex : when patients have cancer phobia and they want to make sure that the lesion they have is not a malignant one.
7. Aid the diagnosis of a systemic disease, ex : amyloidosis , Sjögren's syndrome (we take biopsy from the labial mucosa to confirm the diagnosis ) , homocystinuria in children is difficult to diagnose in blood tests (we take biopsy from the oral cavity, so we can see iron deposits in the submucosa ) .

* We can take also a biopsy from a bone lesion.

**Types of biopsy:**

1. Excisional : complete removal of the lesion. (diagnostic and therapeutic).
2. Incisional : removal part of the lesion.

* Excisional and incisional are the main types .
* It depends on : size, shape, type, and location.

If the lesion is small , we take excisional biopsy .

* If the lesion is suspicious for malignancy we take incisional biopsy, which mean we remove part of the lesion not all.

1. Exofoliative cytology : used for screening purposes (Pap smear, which is used for cervical cancer) using cotton pellet , not accurate for diagnosis .
2. Brush biopsy : screening purposes (Pap smear) using small brush. (it takes cells from the whole thickness of the epithelium, and nothing from the submucosa so its more accurate than the exofoliative cytology which takes from the superfacial layer only .
3. Needle biopsy (also called aspiration) : used in radiolucent lesions in bone and neck masses. If we have a radiolucent lesion first of all we do aspiration to know the type of fluid or even if there is fluid or not .

* Sometimes no fluid is aspirated, but instead cells are aspirated.

**Processing:**

1. Fixation in 10% buffered formalin
2. Dehydration 70% absolute alcohol
3. Immersion in xylen to remove alcohol
4. Liquid paraffin (to obtain paraffin block)
5. Microtome(5-6 microM) ( slicing )
6. Water bath
7. Blank slide
8. Staining using H&E ( H : blue , E : purple )
9. Removal of paraffin

* **Some samples need special stains :**

1. **Immunoflurescence testing:** it is used to look for specific antibodies and antigens in the biopsy .

**2 types :**

1. Direct 🡪 tissue (QUALITATIVE)

Used in immune based diseases, We look for specific antigens in the biopsy, these antigens are attracted by specific antibody, and then it's seen under the microscope using specific light. If there is an antigen, the antibody will bind to it, and a light will occur when examined under the microscope, so we conclude that this tissue contain the antigen of concern.

1. Indirect 🡪 serum/plasma (QUANTITATIVE)

So it helps in disease progress, and response to treatment.

1. **Toluidine blue**

* It’s a type of vital staining will attach to DNA .
* if the lesion has high proliferation rate or high DNA content ,it will absorb the stain so we know that this lesion has a risk of malignant transformation because one of the features of cancer is high proliferation rate .
* the technique is : we make the patient rinse with diluted acetic acid 🡪 water 🡪 toluidine blue 🡪 acetic acid so the area with stain is suspicious

**Punch biopsy:**

* Similar to the **Scalpel biopsy**; (biopsy we take using a blade.)
* Takes the contents of the tissues out.
* **Less traumatic.**
* **The incision is controlled.**
* **Less painful.**
* **NO BLADE. NO SUTURING. 🡪 More convenient to the patient!**

(Biopsy is considered as a **minor surgical procedure**, same as extraction. Thus, we have to take a **comprehensive history**, inform the patient why we are taking the biopsy, its importance and what we are expecting to get from it. We should have **the patient’s CONSENT**, whether verbal or written.)

We should take **a thick/deep biopsy**; this way we are involving the whole lesion as well as part of the normal tissue, whereas taking **a superficial biopsy** will not even involve the whole lesion we are looking for. Thus, an adequate biopsy must contain tissues from both, the lesion and the normal region, to give us the ability to compare them both.

After that we fill a **lab form** that contains:

* The patient’s personal information.
* Why the biopsy was taken.
* Suspected clinical diagnosis.
* Post-op instructions. (Same as those we give after extraction.)

**MAIN investigation in the oral medicine: Biopsy.**

* But, we might encounter other diseases that need other investigations, such as:

**Burning mouth syndrome:**

Here, the patient complains of unexplained sensation in the oral cavity, burning sensation/abnormal taste, without any obvious physical findings 🡪 **medically unexplained symptoms (MUS).**

* Similar to IBS.
* Affects **older females**, after menopause.
* We have to do investigations to exclude the organic causes.
* Some of its **causes**:
* allergies, bruxism, or parafunctional habits, candidiasis, drugs such as ACE (angiotensin converting enzyme).
* Erythma migrans and fissured tongue.
* Hematinic deficiency and magnesium deficiency.
* Diabetes.
* Hypothyroidtism.
* Hyposalivation.

That’s why it's important to take medical history from the patient with oral symptoms.

So any patient with burning tongue syndrome we make a complete blood picture:

1. **CBC**
2. **Hematinic** (which are ferritin, B12, folic acid)
3. **ESR 8**
4. Sialometry (measurement of the salivary how much the patient produce saliva in a certain period of time.)
5. **Thyroid function test**
6. **Blood glucose**
7. In some cases we also make culture andsensitivity when suspecting a microbial cause
8. Psychological assessment
9. Allergy testing

**Xerostomia (dry mouth):** subjective feeling of dryness, not necessarily hyposalivation. **COMMON COMPLAINT.** May be caused by: 1. stress, 2. anxiety, 3. medications; anti-hypertensives, anti-diabetics, 4. psychogenic causes; (chronic complaint of Xerostomia without an identifiable cause 🡪 difficult to manage.)

* **Signs:**

Thick and frothy saliva

Dry tongue

(The examination mirror sticks on the tissues)

* Difficult to manage especially if the cause is unknown.
* Investigations: it’s a long list,
  + - 1. Sialometry (Organic/Psychogenic)
      2. Autoimmune profile (to exclude diseases of immune origin mainly such as *Sjögren's diseases, rheumatoid arthritis*)
      3. Blood glucose **(Xerostomia might be the first manifestation of diabetes!)**

(Investigations depends on the clinical indications.)

**Lymphadenopathy:** is a very important subject; because if you carefully examined your patients, you will find out that a large portion of them has enlarged lymph nodes, and usually the cause will not be obvious while taking history or performing the clinical examination.

Cervical lymph nodes enlargement is divided, according to age:

* Children ( < 10 years of age): most likely a viral infection.
* Teenagers (10 – 20 years of age): bacterial/viral/EBV.
* **< 20 years of age: lymphadenopathy is considered benign, caused mainly by infections.**
* **> (30-40) years of age: malignancy, chronic lymph adenitis with systemic diseases such as sarcoidosis**.

**CAUSES of lymph nodes enlargement:**

* + - 1. Infections (viral / bacterial / fungal )
      2. Malignancy ( primary: lymph nodes lymphoma / secondary: metastatic from other sites; oral cavity cancer)
      3. Inflammatory/systemic diseases (drug induced / MCLNJ)

*Crohn’s diseases, sarcoidosis, rheumatoid arthritis.*

A patient came in last year for a complete denture, when examined they found a mass in s neck (submandibular gland), after biopsy it appeared to be Muco-epidermoid cancer.  
  
Enlarged lymph-nodes in children is mainly caused by viral infections (respiratory tract infections).

* **Suspected malignancy? 🡪 Take a biopsy.**
* **Systemic diseases? 🡪 Investigations related to the systemic disease**.

**Orofacial pain** other than toothache, chronic disease, the patient complaints about pain in the face, neck and jaw.

* **Causes:** vascular, neurological, psychogenic and sometimes referred from the arch.

**The most important thing to know about pain is HISTORY.**

* History 🡪 vitality test 🡪 X-ray. (in most cases)
* In some cases you might need a blood test, MRI, endoscopy…

**Ulcers:**

* Very common, almost everyone are familiar with the *Aphthous ulcer*.
* Numerous number of causes.
* Needs: blood test, **biopsy(maily).**
* The diagnosis of any lesion depends on:

Size, site, duration, number, **induration (malignant or not / hard or not, if it’s hard then there’s a suspicion of malignancy, WHY? Due to a high proliferation rate in a limited tissue space.)**

* When do we take a biopsy?

We have to keep these questions in mind:

Is the ulcer: **Single? / Persistent for more than 2 weeks? / History of trauma? / Hard and indurated? / Associated with skin lesions? / Related systemic signs and symptoms: fever, weight loss...?**

**If the answer for any of these questions was YES 🡪 TAKE A BIOPSY.**

* Lateral border of the tongue: high cancer risk.
* Apthous ulcer? Yes.

History suggests that there’s a systemic disease? Yes.

The ulcer started at an old age? Yes.

**🡪 Hematinic deficiency.**

At young age?

* **The idiopathic form.**
* **(Severe + multiple + painful + persistent) 🡪 investigation especially those related to immunity.**
* **(Gingival enlargement + ulcers on the gingiva + pale fingernail beds + anemia 🡪 Leukemia with the first presentation in the oral cavity.)**
* You have to know the history of dental treatment or trauma.
* You cannot always reach the diagnosis, in some cases you will not be able to reach a final diagnosis.

**White lesions:**

Many causes: congenital, infections, keratosis…

* Candida appears as a thrush white lesion, but it can be scratched.
* **Persistent white lesion with no obvious cause 🡪 take a biopsy to check for dysplasia.**