Review Article

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ORAL BIOPSY: A TECHNIQUE WITHIN THE SCOPE OF PRACTICE OF A GENERAL DENTIST

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ABSTRACT:

Biopsy is the gold standard of diagnostic procedures. The use of Biopsy will reduce the complications due to delay or failure to diagnose. The conclusions drawn from the Pathological evaluation of an oral biopsy are considered essential for establishing a definitive diagnosis and thereafter for the subsequent treatment planning. Although biopsy is widely used in all medical fields, the practice is not so frequently used in dental practice - Primarily because of a lack of awareness of the procedure among dental professionals. Therefore the early diagnosis of invasive oral malignancy may be critical for improving the patient prognosis. Our study provides an update on the biopsy sampling techniques, their application and material required for correct sample storage and transport.

Keywords: Oral biopsy, Surgical technique, Oral diagnosis.

INTRODUCTION:

The word biopsy originates from bios (life) and opsis (vision): vision of life. A biopsy consists of the obtainment of tissue with the purpose of examining it under the microscope in order to establish a diagnosis. The technique allows us to evaluate the histological characteristics of suspicious lesions, extent or spread, their differentiation, depth and to adopt an adequate treatment planning. A biopsy is indicated in any lip or oral mucosal lesions when the lesions in question are seen to persist for more than two weeks (suggestive of malignancy) following the exclusion of local irritants of traumatic or inflammatory origin. After this period of time if the lesions persist, histopathological study is required to rule out malignancy. Such a study is also indicated in the case of bony lesions presenting radiological features suggestive of malignancy. Cystic lesions of Oral cavity, and particularly keratocysts must be processed for histological study. Biopsy findings carry a legal medical value. A biopsy is also indicated in the case of bony lesions with pain, sensitivity alterations and

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radiographic changes like rapid expansion. A biopsy is mandatory of those oral mucosal surfaces that show persistent color changes (white, red or pigmented) or changes in appearance (ulceration, cracking, proliferation). Carefull evaluation is required of premalignant mucosal lesions or conditions such as lichen planus or leukoplakia, in persistent atrophic or erosive areas, detection of systemic conditions requiring histological confirmation in order to establish the definitive diagnosis, e.g., lupus, amyloidosis, scleroderma, or Sjögren's syndrome - which can be confirmed by an oral tissue biopsy. A biopsy is also used in the diagnosis of infectious diseases like tuberculosis and syphilis, after confirmation of the positivity of tests specific to such diseases. Another indication for biopsy is confirmation of the diagnosis of mucocutaneous diseases, blister, bullous lesions affecting the oral mucosa, such as pemphigus or pemphigoid. Benign tumors, with the exception of those of a vascular nature, are to be removed, sending the entire sample for histopathological study to determine the histological origin of the lesion. [1-2]

On the other hand, a biopsy is contraindicated in medically compromised patients that may worsen, or where secondary complications may develop. A biopsy should be avoided in the case of lesions located in very deep regions or in areas of difficult access where the surgical technique proves complicated or hazardous, with the risk of damaging surrounding structures or in the case of suspected vascular lesions such as hemangiomas, due to the risk of massive and persistent bleeding, cases of multiple neurofibromas, due to the risk of neurosarcomatous transformation, or in tumors of the major salivary glands In such cases a wise decession is to referr the patient to a specialist as this would adversely affect the prognosis. Also, a biopsy would be of no use in normal anatomical variants or irritative lesions such as physiological gingival pigmentation, geographic tongue, linea alba, lingual indentations, protuberances, exostosis, etc.

TYPES OF BIOPSY: [1-5]

The biopsy is defined as direct- located superficially, or indirect- lesion lies in depth and is covered by normal mucosa or tissue. Biopsies can also be classified according to the technique used, the material employed, the clinical timing, the location of the target lesion, processing of the sample, and the purpose of the biopsy.

1) The technique employed: Biopsies can be classified as incisional or excisional. The incisional technique involves the removal of a representative portion of the target lesion and of a part of healthy tissue(Fig 1). If the lesion is extensive, different samples should be obtained from the representative area. Requisition sent to the pathologist should contain a schematic representation of the lesions specifying the original location and extent. Such an approach is indicated in the case of suspected malignancy or precancerous lesions. Controversy exists as to the possibility that incisional biopsies of malignant lesions may increase the risk of metastasis, by disrupting the barrier preventing migration of the neoplastic cells

in the bloodstream at the site of the surgical wound. An excisional biopsy in turn involves total removal of the lesion, with a cuff of peripheral and in depth safety margins, applicable to papillomas and fibromas(Fig 2a and 2b). Such biopsies play a diagnostic and therapeutic role.

2) The material used: A biopsy is mainy performed by a conventional scalpel or a punch. Electroscalpels and CO2 laser scalpels are evolving techniques for obtaining a biopsy sample. The oral mucosal punch is a rapid, simple, inexpensive and safe technique for obtaining a representative sample of most oral zones.

The punch is grasped between the index and thumb. If a small diameter sample is obtained, suturing of the residual wound is usually not necessary and bleeding can be controlled by simple pressure. The wound heals by secondary intention with good esthetic results. In other cases, primary wound closure can be performed with sutures. Punches are typically made of plastic or metal. The metal presentations can be reused after sterilizing. The punch is able to obtain several samples at the same time, at different points, and generates less patient anxiety than the conventional scalpel. However, the punch is unable to remove large lesions and cannot be used in intensely vascularized areas, deep lesions, and is limited to epithelial or superficial tissues. On the other hand, while the electroscalpel has the advantage of causing no bleeding due to their self sealing property, its main disadvantage is the induction of thermal damage. Similarly, the laser scalpel produces less extensive thermal damage and less postoperative pain.

3)Clinical timing of sampling: Depending on the clinical timing of the biopsy, it is classified as intraoperative or extraoperative. An intraoperative biopsy allows a rapid histopathological diagnosis. The sample is processed without fixation, frozen with dry ice at a temperature of between -40ºC and -60ºC produces a tissue consistency that allows sectioning with the microtome. The quality of the preparation under such conditions is less ideal, the analysis is more difficult. However, the result can be received in the operating room in a short span of time, thus allowing the surgeon to continue with his plan. This procedure is indicated when a malignant tumor is suspected or N0 neck, and surgery can be planned according to the histological findings of the intraoperative biopsy. On the other hand, an extraoperative biopsy requires a longer processing time. The fixed tissue sample is processed and embedded in paraffin followed by the cutting and staining of thin sections. These preparations offer greater quality than frozen samples, and histopathological evaluation is therefore easier.

4)Sampling location: Depending on the anatomy the biopsy can be obtained from the oral mucosa in its different locations i.e the bone, the salivary glands, lymph nodes and other head and neck tissues. Regarding the salivary glands, it is very common and easy to obtain a biopsy of the lesser salivary glands of the lips for diagnosing or confirming an autoimmune condition such

as Sjögren's syndrome. In the case of retention cysts such as lip mucoceles, an excisional biopsy is indicated. On the other hand, when biopsying the major salivary glands like the parotid gland, fine-needle aspiration biopsies (FNAB) are used, due to their non-invasive nature. A bone biopsy in turn constitutes an indirect technique and require the raising of a soft tissue flap. After raising the mucoperiosteal flap, a chisel and mallet are used, or the target zone is drilled to obtain the specimen with a trephine drill, composed of a hollow cylinder with a cutting edge, that allows the harvesting of bone. Bleeding can be countered with bone wax, oxidized cellulose or a gelatin sponge followed by suturing. In cases where specimen decalcification is required, the Pathologist needs more time to obtain the results. Lymph node biopsy is also an indirect procedure which are used in adenopathies due to inflammatory or neoplastic processes. If a biopsy is decided, then the entire lymph node should be surgically removed.

5)Processing of the sample: The sample can be analyzed frozen, or embedded in paraffin or methacrylate, and can be examined under the electron microscope, or as a fresh sample. Molecular analyses are also possible. The most commonly used technique is embedding in paraffin for light microscopic evaluation. The sampled tissue is fixed in 10% formaldehyde solution. The specimen is processed by means of an automatized, serial hot paraffin embedding system involving progressive dehydration and final cooling and solidification, before sectioning with the microtome. The embedding process takes about 24 hours. Microtome sectioning is then carried out, mounting the specimens on slides and posteriorly removing the paraffin, with rehydration and staining as required. Finally, the specimen is again dehydrated and sealed with a coverslip. The staining techniques used depend on the type of histological study made. On the other hand, embedding in methacrylate is used for electron microscopic studies, and when hard tissues are involved. Electron microscopy is able to reveal a series of morphological features that distinguish normal cells from tumor cells. Fresh specimen studies require transport of the biopsy sample as quickly as possible to the laboratory, for immunofluorescence evaluations. The specimens are to be transported with saline solution to prevent drying. In dental setting, these procedures are useful for diagnosing mucocutaneous diseases of an autoimmune nature, such as pemphigus, pemphigoid, erythema multiforme and lichen planus.

Purpose of the biopsy: Biopsies can be performed for diagnostic or experimental purposes. Thus, apart from diagnosis with a view to treatment, a biopsy can yield important information for the histopathological study of new disease entities.

The principal oral cavity carcinogens are chemical (tobacco smoke), physical (radiation) and infectious agents (papillomavirus, Candida); as mutagens, they are able to induce structural changes in genes and chromosomes through point mutations, deletions, insertion or rearrangements.

HOW TO PERFORM AN ORAL BIOPSY:

The necessary instruments are limited such as a mouth mirror, exploratory probe, toothless dissection forceps, mosquito forceps, scalpel handpiece and number 15 blade, syringe for anesthesia, scissors and suture mounted needles. For bone biopsies we can use trephine burs, a chisel and mallet, a motor-driven handpiece with drills and curettes. As to the required material, a glass bottle containing 10% formalin solution is advised. A biopsy requires due sterilization of the instrumentation and disinfection of the surgical field. Anaesthesia with a vasoconstrictor to minimize bleeding should not be applied in the actual biopsy target zone but at a certain distance with a separation of 3-4 mm, and at the four cardinal reference points (top, bottom, left and right) to avoid alterations. Traction suture or tissue forceps are to be used to fix the tissue to be removed. Compression or destruction of the specimen should be avoided by making a clean and deep cut, taking care to avoid tearing or compression. In excisional biopsies, the lesion is to be palpated carefully, determining its depth, and the incisions should slightly exceed the total depth of the lesion. In incisional biopsies the incision should include a significant portion of the suspect tissue, though also a part of adjacent normal tissue. Next step is control of bleeding. After obtaining the sample, washing with physiological saline is indicated, followed by fixation. Sample processing begins once the specimen has been obtained, with the purpose of allowing tissue study under magnification. The steps comprise fixation, cutting into fragments or blocks, embedding, sectioning, staining and examination. The fixation bottle must be labeled with water-proof tape, and using a pencil for writing. Each specimen is to be placed in a separate bottle or container, with due identification of the different zones involved.

Infection is attributable to a deficient surgical technique. Treatment in such situations consists of drainage of the infectious material, and antibiotic medication. Another possible complication of oral biopsies is sensory impairment which are secondary to sensory nerve damage during the biopsy procedure. The symptoms are paresthesia of variable intensity that can persist for hours or even several months, depending on the magnitude of the damage caused.

Biopsy artifacts are due to defective sampling techniques, problems during transport, or incorrect processing of the tissue in the laboratory. A small sample usually consists of a narrow strip of delicate mucosa, which tends to fold onto itself during fixation and thus the junction between the epithelial and connective tissue components is usually lost.

The pathologist thus may prepare the report in three different ways: certainty diagnosis, incompatibility diagnosis, or orientative diagnosis. The certainty diagnosis is a true histopathological diagnosis. This diagnosis is stated when the findings are pathognomonic of a given type of lesion. On the other hand, a diagnostic incompatibility report is issued when no lesions typical of a given disease entity have been observed. Finally, in some cases the

pathologist is unable to draw any conclusions, and the resulting report is of a merely descriptive nature.

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FIGURES:

Fig 1 :

Fig 2a :

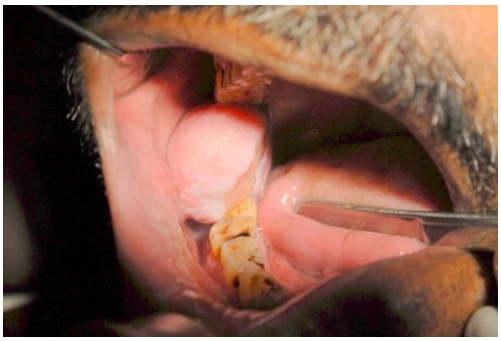

Fig 2b :