

Review Article

A Review on Oral Mucosal Biopsies with Considerations on Type of Biopsy According to Clinical Diagnosis and Handling of Tissues

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ABSTRACT:

Biopsies are an important diagnostic tool for the diagnosis of lesions ranging from simple periapical lesions to malignancies. The utmost important is the selection of suitable technique, representative sample that allows the pathologist, in reaching a helpful and meaningful diagnosis. This paper presents an updated view on performing biopsies according to clinical diagnosis which will be of use to general dental practitioners in avoiding incorrect manipulation of biopsy samples.

Keywords: Oral biopsy, Incisional biopsy, Excisional biopsy.

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Introduction

The word biopsy originates from the Greek terms bios (life) and opsia (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.¹ An unsuitable, unrepresentative sample is of no use to the pathologist, clinician or most importantly the patient who would be ill served by an unnecessary repeat procedure.² The technique allows to establish the histological characteristics of suspect lesions, their differentiation, extent or spread, and to adopt an adequate treatment strategy.^{3,4}

Types of biopsy

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.⁵

According to Technique Employed:

Depending on 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.^{6,7} The incisional biopsy is also termed as diagnostic biopsy.⁸ 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 and thus favoring invasion of the bloodstream at the site of the surgical wound.⁹ In certain tumors such as hemangioma or melanoma, the biopsy should be performed with complete and extensive resection of the lesion, in order to avoid severe bleeding or metastatic spread,

respectively.¹⁰ An excisional biopsy in turn involves total removal of the lesion, with slight peripheral and in-depth safety margins, applicable to papillomas, fibromas or granulomas.^{11,12} Such biopsies play a diagnostic and therapeutic role, since complete removal of the lesion is carried out, ensuring the inclusion of a peripheral margin of normal tissue.¹³ The biopsy should include surrounding normal tissue with adequate depth of underlying connective tissue.⁸ Others techniques include aspiration through a large bore needle, exfoliative cytology technique whereby the surface of the lesion is scraped and smeared on a microscope slide and studied by the pathologist after suitable staining.⁸ Recent advancements in exfoliative cytology such as development of cytomorphometric method, DNA content determination, detection of tumor markers has contributed to renewed interest in this field.¹⁴

According to Material used:

A number of cutting instruments can be used when performing a biopsy: a conventional scalpel, a punch, and the so-called B-forceps. Electroscalpels and CO₂ laser scalpels deserve separate mention, for although they are used by some authors, their associated inconveniences make them scantily recommendable for obtaining a biopsy sample. The oral mucosal punch is a rapid, simple, safe and inexpensive technique for obtaining a representative sample of most oral zones.^{15,16} The punch is able to obtain several samples at the same time, and at different points, and generates less patient anxiety than the conventional scalpel.¹⁷ 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.^{15,16} Other instruments, such as the so-called B forceps, can also be used to obtain a biopsy. This instrument was developed by Bermejo,¹⁷ and facilitates, simplifies and especially homogenizes soft tissue biopsies

of the oral cavity and of the lesser salivary glands. These forceps are equipped with two cusps - one with a window - to allow compression of the target tissue between them. The target zone is positioned exposed within the window, and the compressive effect of the cusps allows us to work in an ischemic field within the window.¹⁷

According to Clinical Timing of Sampling:

Depending on the clinical timing of the biopsy, the procedure can be classified as intraoperative or extraoperative. An intraoperative biopsy allows a rapid histopathological diagnosis. The sampled material is processed without fixation, frozen with dry ice. In this sense, freezing at a temperature of between -40°C and -60°C produces a tissue consistency that allows sectioning with the microtome.^{4,6} A very important procedure is the intraoperative examination of the margins of a resected malignant tumor, to evaluate the possible existence of tumor invasion beyond these margins. In such a case, wider resection is required.¹³ 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.^{1,4}

According to Sampling Location:

Depending on the topography involved, the biopsy can be obtained from the oral mucosa in its different locations, the salivary glands, bone, lymph nodes, and other head and neck tissues.¹⁹ 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. All the typical microscopic characteristics of this syndrome, with the exception of the clusters of myoepithelial cells, are usually observed in the lesser salivary glands, and the lip

glands are the most widely used option, in view of their accessibility. Following local anesthetic infiltration of the zone, a small incision measuring approximately 10 mm is made in the mucosa of the lower lip; the thickness of the sample should be sufficient to obtain the glands without affecting the muscle layer or arteries. In the case of retention cysts such as lip mucoceles, an excisional biopsy is indicated.⁵ On the other hand, when biopsying the greater salivary glands, and specifically the parotid gland, fine-needle aspiration biopsies (FNAB) are increasingly used, due to their non-invasive nature.¹⁹ A bone biopsy in turn constitutes an indirect technique. These procedures are usually more difficult, and require the raising of a soft tissue flap and an adequate approach to the bone layer. After raising the mucoperiosteal flap, a chisel and mallet are used, or the target zone is drilled to obtain the specimen. In the case of certain bone tumors, a piece of trabecular bone can be collected using a curette. Bleeding can be countered with oxidized cellulose, a gelatin sponge or bone wax, followed by suturing of the overlying mucosal layer. The specimen thus obtained is sent to the pathologist together with a detailed report on the patient history, and clinical and radiological characteristics. It is often advisable for the surgeon to see the X-rays with the pathologist and radiologist, before establishing the definitive diagnosis. In some cases, such as when specimen decalcification is required, the laboratory may need more time to obtain the results.^{1,4,20} Lymph node biopsy is also an indirect procedure. In this context, adenopathies are commonly the result of inflammatory or neoplastic processes.⁵

Handling of mucosal biopsies

Care should be exercised when handling mucosal biopsy specimens as they can be particularly prone to damage. Sometimes specimens can be rendered of little diagnostic value due to poor handling which produce a crush artefact in histological section. A popular method is to

place a suture within the mucosa that is to be removed, and hold the ends of the suture in an artery forcep or sometimes tie a loose knot above the mucosa, while undertaking the biopsy. A tight knot close to the specimen, however, is to be avoided as it may result in the tissue being crushed. The use of such a suture can aid the biopsy procedure by providing traction and preventing unwanted movement of tissue when taking a biopsy from mobile structures such as the tongue. It also helps the pathologist to orientate the biopsy sample for sectioning. The 'traditional' technique using toothed tissue forceps to grasp the specimen is acceptable providing care is taken and the area grasped is away from the main site of interest. The punch biopsy technique is an alternative to the traditional incisional biopsy.²¹ Essentially the punch comprises a circular blade attached to a plastic handle. Diameters of two to ten millimetres are available. This removes a core of tissue the base of which can be simply and atraumatically released using curved scissors. Alternatively, the specimen can be lifted from the mucosal surface and the base undermined with a scalpel. Care should be taken if aspiration is being used to prevent the specimen being sucked away. The resultant wound may not require suturing if using the smaller diameter punches.²² Generally when performing a mucosal biopsy an adequate depth of tissue should be obtained to include the epithelium and a few millimetres of underlying lamina propria. Traditional incisional biopsies are in the shape of an ellipse, the length of which should be approximately three times the width.²³ The site of the biopsy may determine which of the above techniques are possible.²²

Orientation of biopsies

The majority of mucosal biopsies are incisional, however, occasionally small lesions may be excised encompassing diagnosis and treatment in one operation.

Table 1: Points to consider prior to mucosal biopsy²²

1. Why is biopsy being taken? Eg to confirm a mucosal disease such as lichen planus or to exclude malignancy.
2. What information is required from the pathologist? Eg is the lesion completely excised.
3. Is the biopsy to exclude malignancy? Therefore take the biopsy from the edge of the lesion
4. Is the biopsy incisional or excisional? Eg For excisional biopsies a margin of surrounding normal tissue will be required.
5. Will the specimen be required to be orientated? This is important for excisional biopsies so that if residual tumour is left or the excision is close to the margin, the surgeon knows where to perform a re-excision if necessary.
6. Is a fresh specimen required? For vesiculobullous lesions these are often required for direct immunofluorescence. They are also used if a rapid diagnosis is required.

Table 2: Guidelines for an appropriate biopsy²²

Clinical diagnosis	Type of biopsy	Suitable for general dental practice
Chronic ulcer or squamous cell carcinoma	Incisional biopsy of margin of ulcer	No, urgent referral to hospital
Leukoplakia/erythroplakia	Incisional or punch biopsy of worst area consider multiple biopsies if extensive lesion	No, referral to hospital
Mucosal lichen planus	Incisional biopsy of a representative area	Only very experienced practitioners
Bullous lesions (pemphigus pemphigoid, etc)	Incisional or punch biopsy of unaffected mucosa close to bulla or erosion plus fresh tissue specimen	No, referral to hospital
Granulomatous diseases (Crohn's, orofacial granulomatosis, ulcerative colitis, TB)	Deep incisional biopsy plus fresh sample to microbiology if infective agent suspected	No, referral to hospital
Mucocoele	Careful excision biopsy	Yes, with care
Fibroepithelial polyp, pyogenic granuloma, epulis	Excision biopsy	Yes
Minor salivary gland tumour	Palate: deep incisional biopsy Upper lip: excisional biopsy	No, urgent referral to hospital
Major salivary gland tumour	FNAC/FNCB (Seek advice)	No, urgent referral to hospital

If malignancy is suspected, the biopsy should be of sufficient depth and have a surrounding margin to ensure adequate clearance. In case the lesion was not completely excised it should be orientated. This can be achieved by placing a suture at one known margin, for example the anterior or superior margin. This would enable the pathologist to confidently indicate the precise location of any residual tumour. The same applies for surgical resection specimens. A technique new to the oral cavity but established for other bodily sites is that of the brush biopsy. Essentially a hybrid of fine needle aspiration biopsy and exfoliative cytology, this technique uses a small brush to sample cells from all the layers of the epithelium. Only one large study from the United States has yet been published but they claimed a high sensitivity and specificity using the technique to detect dysplasia.^{24,22}

Conclusion

Patients often present with intraoral pathology to the general dental practitioners. Thus, it is important for the general dental practitioners to be aware of how to deal with pathology and to understand about the investigating techniques that might assist in fetching the diagnosis. However if a referral is made to a specialist for biopsy the referring practitioner still needs to be familiar with the procedures and obtained diagnosis so that patient can be appropriately managed.

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