Journal of Advanced Clinical & Research Insights (2017), 4, 162–165

REVIEW ARTICLE

Oral biopsy in general dental practice

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Key words
Biopsy, complications, punch, procedure, transport

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Received: 10 July 2017;
Accepted: 14 August 2017

doi: 10.15713/ins.jcri.184

Abstract

Proper management of a patient with any oral lesion begins by means of a precise diagnosis. The existing golden criterion for identification is the histopathologic assessment of a tissue biopsy of the doubtful lesion. This is mainly depending on the clinician undertaking a suitable biopsy and providing sufficient medical information, and on the pathologist accurately interprets the biopsy result. Thus, this article focuses on the procedures to undertake biopsy in general dental practice.

Introduction

Mainly oral and maxillofacial surgeons are dejecting general dental practitioners from taking surgical biopsy specimens. In the past few years, undergraduate students in dental specialty areas such as oral medicine and oral pathology, and oral and maxillofacial surgery, are trained to amplify their self-confidence in investigating and as well as taking biopsy ability.[1]

Proper management of a patient with any oral lesion begins by means of a precise diagnosis. The existing golden criterion for identification is the histopathologic assessment of a tissue biopsy of the doubtful lesion. This is mainly depending on the clinician undertaking a suitable biopsy and providing sufficient medical information, and on the pathologist accurately interprets the biopsy result. Thus, this article focuses on the procedures to undertake biopsy in general dental practice.[2]

Biopsy

The phrase "biopsy" originates from the Greek terms bios (life) and opsis (vision): Vision of life. A biopsy consists of the attainment of tissue from a living organism with the intention of investigating it under the microscope to generate a diagnosis depending on the sample. Biopsy is a procedure of removal of the hard and soft tissue from a living person for microscopic examination to substantiate or establish the diagnosis.[3]

Indications for Biopsy

- Any lesion that persists for more than 2 weeks with no obvious etiologic basis.
- Even after 2 weeks, if any inflammatory lesion is not responding to the treatment.
- Any constant hyperkeratotic lesion and any lesion suspected as neoplasm.
- Anesthesia or paresthesia and pain associated with lesions of unclear etiology.
- Osseous lumps or fibrous hyperplasia interfering with oral function.
- Radiolucent or radio-opaque osseous lesions.
- Material from a constant draining sinus whose source cannot be readily recognized.
- Labial, buccal, or lingual muscles showing interstitial lesions.[4]

Contraindications for Biopsy

In persons with systemic disorders and severe medical conditions, a biopsy procedure can worsen medical condition

leading to complications. Deeply situated lesions and in difficult access, performing biopsy will result injury to neighboring structures or complications. Hemangioma is considered a contraindication for biopsy due to the risk of massive and unrelenting hemorrhage. Unrelenting and massive hemorrhage are complications seen in hemangioma if biopsy performed. Biopsy should be avoided in patients receiving intravenous bisphosphonates due to the risk of bisphosphonate-related osteonecrosis of the jaw. Biopsies should not be performed in multiple neurofibromas and in major salivary gland tumors due to transformation to neurosarcoma.[5,6]

How to obtain an appropriate biopsy

A suitable biopsy basically contains tissue that is representative of the most important alteration in the lesion and is proper for pathologic assessment.

Achieving a proper biopsy consists of three important factors:

- Selection of the biopsy site,
- The procedures used, and
- The proper submission of the biopsy sample.

Selection of the biopsy site

One part of the lesion to another varies in disease severity in a doubtful oral lesion, predominantly a large one. For instance, a lesion may have mild dysplasia in one part and early invasive squamous cell carcinoma (SCC) in one more. An appropriate biopsy would consist of tissue from the most horrible component of the lesion (in this example, the early invasive SCC). This may be evaluated from multiple biopsies, the use of adjunct visual tools, and its clinical appearance.[2,6]

Selecting areas with erythroplakia or non-homogeneous leukoplakia (e.g., an indurated verrucous, or a nodular area; ulcerated or a reddish area) increases the likelihood that the biopsy will include the area with the majority of severe disease. Captivating biopsies from different parts of a lesion, predominantly if the lesion is extensive or if it shows a diversity of clinical presentations, can permit consistent biopsy grades. For example, taking two biopsies from representative areas for a 4-cm lesion or individuals with dissimilar clinical appearances is necessary. By means of toluidine blue or direct fluorescence visualization can assist a clinician highlight on the whole severe or notable transform for biopsy.[2,6]

Biopsy procedures

Clinicians employ different biopsy procedures, with a punch biopsy, a scalpel, an electro-knife, or a laser. Chiefly for excisional biopsies in mucosal lesions assumed of malignancy or premalignancy, the make use of an electro-knife or a laser must be avoided. These procedures might produce a coagulative defect that disturbs histologic description of the samples, predominantly the assessment of the border. Punch biopsy has been revealed to generate smaller amount of defects than scalpel biopsy and is discussed at this point.[2,5]

The procedure for acquiring a punch biopsy involves the following steps

1. Indication of the biopsy site by means of toluidine blue staining like a visual aid
   - Administering local anesthesia
   - For a highly vascularized site (such as the tongue or lip) or lesion, anesthetics containing vasoconstrictors have to be selected to decrease bleeding (e.g., epinephrine of 1:50,000 or 1:100,000 in lidocaine).
   - The anesthetic must be administered to the area neighboring to the biopsy area as straight injection of the anesthetic solution into the biopsy area can provide source to deformation defects in the sample.[2]
2. A 5-mm punch with 1.5-mm bevel of the cutting edge and instruments for achieving punch biopsy is shown in Figure 1.
   - Determining the size of the biopsy.
   - Size of biopsies has to be 3 mm in diameter.
   - Punch biopsies of 4 or 5 mm in width are suggested to guarantee a satisfactory sample size because biopsies get smaller following to formalin fixation, the depth have to be slightest of 2 mm.
   - SCCs or oral premalignant lesions commonly need deeper biopsies as the lesion shows distinctive epithelial hyperkeratosis and dysplasia. Hence, the suggested depth is 4 or 5 mm. Typically, 1.5 mm bevel of the cutting edge, used as a depth guide.[2,5]
3. Placing of the punch into the tissue with a circular movement to make possible cutting the tissue to the suitable depth.
4. Scalpel is used to break up the biopsy sample.
5. Place the tissue on a piece of paper with the connective tissue facing downward for 1 min to avoid the sample as of curling throughout fixation.
6. Area should be sutured close to the wound and make sure appropriate hemostasis.[2,5]

General principles of biopsies

1. Written consent to be taken before performing any biopsies. Mainly to inform about the biopsy procedure and

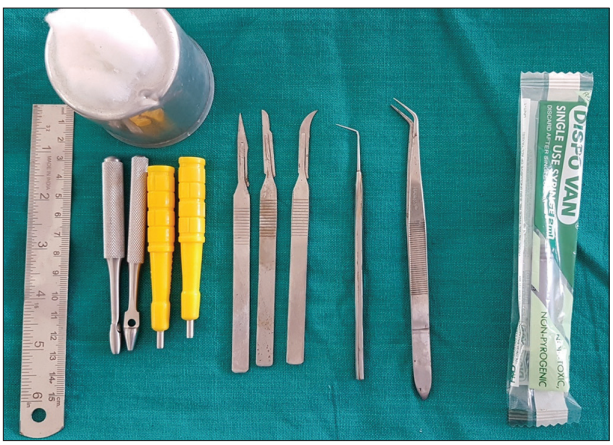

Figure 1: A 5-mm punch with 1.5-mm bevel of the cutting edge and instruments for obtaining punch biopsy

also details of possible risks being mentioned in the consent form.
2. The instruments needed for biopsy are usually the same as those used in surgery, including various forceps, surgical blades, syringes, and mirrors for anesthesia, etc.
3. Extremely necessary to examine the values of disinfection for instruments and the biopsy position.
4. The sample is positioned in fixative regularly used 10% neutral buffered formalin. The quantity of fixative has to be at least 20 times the size of sample to avoid improper fixation or autolysis. No other fixative has to be substituted for the formalin fixative.
5. For assumed autoimmune or vesiculobullous disorders, two tissue samples should be submitted: One in formalin for routine microscopy and the other in Michel's solution for direct immunofluorescence. Formalin-fixed tissue cannot be studied under immunofluorescence.
6. If the specimen is to be sent through the post, accurate details of the regulations governing pathological specimens, accessible from the post office, have to be followed.
7. Mainly regulations need a primary container that is firmly sealed and wrapped in adequate absorbent material, such as paper towel, in case of seepage.
8. The wrapped container has to then be positioned in a sealed plastic bag, which is then placed in a firm outer container that can be protected by adhesive tape.
9. The package should indicate "pathological specimen" or "human tissue" and "fragile" or "handle with care," with the whole name and address of the dispatcher.
10. If several tissue specimens are created during sampling, all the segments should be sent to the laboratory in, noticeably labelled container.
11. If possible, a color photo of the lesion has to be included to create potential clinical and pathologic association.
12. Wide opening container should be selected. As the specimen can become hard and rigid after being fixed; hence, it might be hard to get back it from the container, leading to damage of the specimen.
13. Plastic containers with screw caps are suggested than glass containers which might break and injure operators.
14. Further, if broken, glass fragments might pierce into the tissue specimen and damage the microtome throughout the preparation of tissue sections.
15. Always pertinent clinical information, collectively with the location of the lesion, duration, size, its appearance, past account of dysplasia or SCC, and the patient's risk factors must constantly be accompanied with biopsy sample.[2,5-7]

Complications of oral cavity biopsies

Hemorrhage is probable to happen throughout the first 24 h following sampling due to clot disturbance or secondary to loosening of the suture. Wound dehiscence is an uncommon complication, which commonly occurs 5–8 days after sampling. An extra difficulty is paresthesia which may persist for some hours or months.[5]

Commonly occurring artifacts during oral biopsy procedures

Infiltrating local anesthetic solution inside the biopsy site directly may lead to sample defects. Local anesthetics have to be administered deep or near to the proposed biopsy site. Further, a regional block can be used; however, the problem with regional block is that the hemostatic effect of adrenaline in local anesthetic solutions reduces.[8]

Crushing of the tissue with tissue forceps throughout the procedure can lead to "crush artifacts." The crushing of the tissue can destroy the histopathological quality of the tissue sample and may produce tissue tears and "pseudomicrocysts."[4,5,9]

Applying some products to the lesion may persuade to tissue modification. Colored antiseptics to clean the surface of incision on the mucosal site where biopsy is to be taken specially iodine containing surface antiseptics must not be used, as they might discolor the tissues. Hence, it is advised to use 0.12–0.20% chlorhexidine solution is preferred. Toluidine blue does not interfere with staining.[4,5,9]

When biopsy specimen is taken from the oral cavity, it should be immersed immediately in a fixative solution. The fixative solution most frequently used for routine biopsies is 10% neutral buffered formalin. Insufficient fixation results in tissue deterioration, causing complexity in explanation. Ensuring an adequate amount of fixative solution, the fixative solution should be at least 20 times the quantity of the specimen. Shrinkage occurs mainly during fixation and processing, thereby reducing the biopsy size. Other solutions such as saline solution, water, and alcohol can cause severe destructive changes in epithelial structures.[5,10]

Conclusion

To overcome the errors encountered right from the beginning of taking a case history to establishing the histopathological diagnosis, utmost care and precautions should be carried out by all the involved individuals to avoid any inconvenience both to the clinician as well as the patient.

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How to cite this article: Hunasgi S, Koneru A, Manvikar V, Amrutha R, Reddy KMP. Oral biopsy in general dental practice. J Adv Clin Res Insights 2017;4:162-165.