

KNOWLEDGE OF ORAL BIOPSY PROCEDURE AMONG DENTAL INTERNS AT A TERTIARY HOSPITAL IN EASTERN NEPAL

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ABSTRACT

Introduction

Various diagnostic procedures are available to reach a diagnosis in case of oral lesions. Biopsy is one of the important tools for confirmatory diagnosis. It becomes imperative not only for dentists but future dentists to have adequate knowledge regarding oral biopsy procedures.

Objectives

To assess the knowledge of oral biopsy procedure among dental interns.

Methodology

A web-based cross-sectional study was conducted among interns at College of Dental Surgery, B.P. Koirala Institute of Health Sciences. A questionnaire was prepared and Google Form link was shared with the signed-up participants via messaging apps; Viber and Whats App. The descriptive statistics were calculated using Microsoft Excel 2016.

Result

Out of 54 participants, 53 (98.15%) and 50 (92.5%) of the interns knew about incisional and excisional biopsy respectively. Only 27 (50%) of them responded that every lesion should be sent for histopathological examination. Only 25 (46.3%) of the interns were aware that the removal of tissue by laser or electrosurgery can introduce artefacts or tissue distortion and 27 (50%) responded that punch biopsy generally produces few artefacts within the biopsied sample. Seventy seven percent of the interns responded that volume of the fixative should be two times the volume of the biopsy specimen, while 15 (27.78%) responded that normal saline could be used as a fixative.

Conclusion

The present study revealed, dental interns had a good understanding regarding oral biopsy and also highlighted the need for further training and modifications in curriculum.

KEYWORDS

Biopsy; Biopsy procedure; Dentist

Citation

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INTRODUCTION

The Greek words bios, which means "life," and opsis, which means "vision," were combined to form the English word biopsy.¹ Biopsy is a valuable diagnostic tool for confirming many oral condition or disease.² Failure to identify the pathology will delay timely intervention proper care and could have serious consequences.³ Oral biopsies is important as it aid in both diagnosis and the classification of oral lesions.⁴

Care must be taken during the biopsy process because any mistake or error while doing it could lead to an inaccurate histopathological diagnosis of the lesion.² A biopsy site selection, local anaesthetic administration techniques, the surgical technique used to take the biopsy, appropriate size and depth of the tissue, and the subsequent fixation technique all affect the quality of the biopsy sample and hence the histopathology slide interpretation. The pathologist can make the correct diagnosis with the help of an accurate and pertinent clinical description of the lesion along with a good biopsy sample.² Therefore, to execute an effective oral biopsy, one has to have some basic technical expertise. The dental professional should be knowledgeable about the oral biopsy procedures and challenges faced during the biopsy. In light of this, the study was planned to evaluate the knowledge of dental interns regarding oral biopsy.

METHODOLOGY

A web-based cross-sectional study was conducted among interns of the same batch at College of Dental Surgery, B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal from October to December, 2021. Total population census sampling was used. The study was approved by Institutional Review Committee, BPKIHS (IRC/2094/20). A semi-structured pro forma was prepared and modified based on relevant literature.⁶ It consisted of socio-demographic data and four sections having 19 close-ended items on oral biopsy procedure with three options: "Yes," "No," and "Do not know."

The Google Forms were created using docs.google.com/forms, and the link was shared with the signed-up participants via messaging apps Viber and WhatsApp. The completed questionnaires were exported to Microsoft Excel 2016 and Statistical Package for the Social Sciences software (version 21) was used to produce descriptive statistics such as frequency and percentage in order to analyse the data. The findings were presented as tables and graphs.

RESULTS

A total of 54 interns responded to the questionnaire, of them 37 (68.52%) were females, and the mean age of the respondents were 24±1.012 years (Table 1).

Table 1: Age and gender of the participants (n=54)

Variables	Number	Percentage	
Gender	Male	17	31.48
	Female	37	68.52
Age (years)	23	7	12.96
	24	23	42.59
	25	12	22.22
	26	11	20.37
	27	1	1.85

Out of 54, 53 (98.15%) and 50 (92.59%) of the responders knew about incisional and excisional biopsy respectively. However, only 27 (50%) responded that every lesion/pathology should be sent for histopathological examination (Table 2).

Table 2: Knowledge regarding oral biopsy definition and basic concept (n=54)

S.N.	Knowledge regarding oral biopsy definition and basic concept	Responses	Number	Percentage
1	Does incisional biopsy mean taking a sample of the lesion?	Yes	53	98.15
		No	1	1.85
2	Does an appropriate incisional biopsy include tissue samples from the most severely/significantly affected part of the lesion?	Yes	44	81.48
		No	10	18.52
3	Does excisional biopsy mean the removal of the entire lesion?	Yes	50	92.59
		No	4	7.41
4	Should every lesion/pathology be sent for histopathology examination?	Yes	27	50.00
		No	23	42.59
		I do not know.	4	7.41
5	Should incisional biopsies of the mucosa be at least 3 mm in diameter and 2 mm in depth?	Yes	41	75.93
		No	3	5.56
		I do not know.	10	18.52
6	Is biopsy taken from the edge of the lesion in case of suspected malignancy?	Yes	48	88.89
		No	3	5.56
		I do not know.	3	5.56
7	Is a margin of surrounding normal tissue required for excisional biopsies?	Yes	50	92.59
		No	2	3.70
		I do not know.	2	3.70

Out of 54, 45 (83.33%) participants responded that in case of multiple samples of a lesion, each sample should be submitted in a separate, clearly labelled container (Table 3).

Table 3: Knowledge regarding oral biopsy tissue sample handling (n=54)

S.N.	Knowledge regarding oral biopsy tissue sample handling	Responses	Number	Percentage
1	Does proper orientation of the surface lesion specimen assist the oral pathologist in sectioning the specimen to avoid tangential cuts?	Yes	51	94.44
		No	0	0.00
		I do not know.	3	5.56
2	Can toluidine blue or direct fluorescence visualization help a dental surgeon highlight the most severe or significantly changed tissue for biopsy?	Yes	50	92.59
		No	1	1.85
		I do not know.	3	5.56
3	If multiple samples of the lesion are taken, should we submit each sample in a separate, clearly labelled container?	Yes	45	83.33
		No	1	1.85
		I do not know.	8	14.81
4	Is it mandatory to label the specimen container with the patient's name, age, date of biopsy and the site of the biopsy?	Yes	53	98.15
		No	1	1.85

Only 25 (46.3%) of the interns were aware that the removal of tissue by laser or electrosurgery can introduce artefacts or

tissue distortion and 27 (50%) responded that punch biopsy generally produces few artefacts within the biopsied sample (Figure 1).

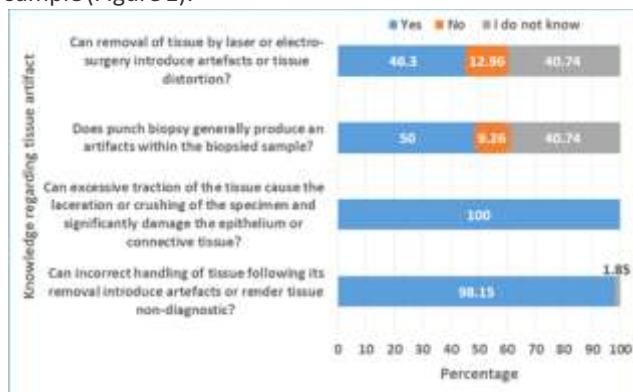


Figure 1: Knowledge regarding oral biopsy tissue artifact (n=54)

Out of 54, 42 (77.78%) participants responded that volume of the fixative should be two times the volume of the sample, while 15 (27.7%) responded that normal saline could be used as a fixative. Biopsy samples should be washed before placing them in fixative was responded by 30 (55.56%) participants. (Figure 2).

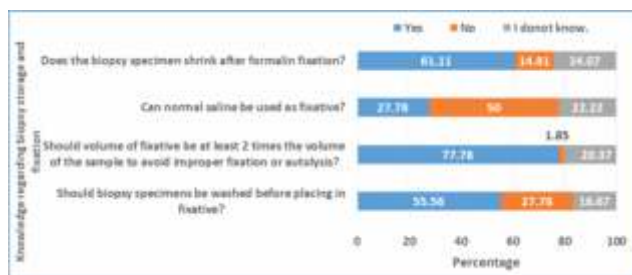


Figure 2: Knowledge regarding biopsy storage and fixation (n=54)

DISCUSSION

Evidence-based treatment choices and therapeutic outcomes are becoming increasingly important in the practice of modern dentistry and medicine. Clinically, oral biopsies must be performed by a dentist in order to diagnose oral lesions. The oral biopsy procedure is a competence skill that could be learned and gained expertise with time. The dental surgeon performing the biopsy is responsible for obtaining enough tissue and handling it properly so that the sample is sent to the pathologist in a state that is suitable for additional processing and analysis. In order to avoid misidentification of the lesions, dentist should be able to perform biopsies but they also need to be aware of a variety of factors impacting the histopathologic interpretation of an oral biopsy result.²

Almost every intern have the knowledge of incisional and excisional biopsy which is in contrast to the study done by Sunil et al where 63% of dentists were familiar with incisional and excisional biopsy.⁷ Half of the participant responded that every lesion should be sent for histopathological examination which is in contrast to a study done by Azzadeh et al where 62.6% of dental students and 100% dentist agreed to this fact that histopathological

assessment of each abnormal oral tissue sample taken is necessary, while study done by Thete et al only 10% were agreed to this.^{8,9} A study done by Sunil et al showed that only 11% of dentist think that every lesion should be send for histopathological examination.⁷ According to the American Academy of Oral and Maxillofacial Pathology, any aberrant/abnormal tissue should be quickly submitted for microscopic assessment and analysis.¹⁰ Regardless of how certain the clinician is of the diagnosis, any abnormal tissue taken from the oral cavity should be sent for histological analysis.¹¹

One out of four participants were unaware that oral mucosa biopsies needed to be at least 3 mm in diameter and 2 mm deep. Mucosal biopsies must be at least 3 mm in diameter and 2 mm deep, while they must be deeper in cases of suspected squamous cell carcinoma and oral pre-malignant lesions due to thicker epithelium and hyperkeratosis. In these circumstances, 4-5 mm should be the minimum required depth.¹²

Approximately nine out of ten participants responded that biopsy should be taken from the edge of the lesion in case of suspected malignancy. It would be preferable to biopsy the lesion and some nearby clinically normal epithelium if the goal of the biopsy was to rule out suspected malignancy.¹³ Nine out of ten participants responded that margin of the surrounding normal tissue is required in case of excisional biopsy. Smaller lesions less than 1 cm in diameter that appear benign on clinical examination, should be treated with excisional biopsy. The entire lesion along with 2-3 mm of the normal surrounding tissue are removed.¹⁴

Nine out of ten participants responded that toluidine blue or direct fluorescence helps to highlight the most severe or significantly changed tissue for biopsy. Toluidine blue is an easily available, economical, meta-chromatic dye known to bind DNA of dividing cells. In various studies, it has been mentioned to stain potentially-malignant and malignant cells but not normal mucosa.^{15,16} It binds to cells with high DNA and RNA concentrations because of its affinity for nucleic acids.¹⁷ Similarly, the loss of normal tissue auto fluorescence in dysplastic and neoplastic tissues is also visible using direct fluorescence method; these alterations are the result of a series of histological and biochemical changes.¹⁸ They can therefore be used as a supplemental tool to look for early, subtle clinical changes.

Almost all participants (98.15%) responded that incorrect handling of tissue following its removal introduces artefacts or render tissue non-diagnostic, also excessive traction of the tissue causes the laceration or crushing of the specimen and significantly damage the epithelium or connective tissue. Poor handling of biopsy at any point could lead to a non-diagnostic biopsy and force the patient to undergo the procedure again.¹⁹ Only half of the interns in our survey responded that punch biopsy often results in few artefacts in the biopsied sample. Fragmentation of the sample may happen during punch biopsy while removing the tissue sample from the underlying base using scissors.²⁰ As a result, dental surgeons need to take extra care while cutting tissue for punch biopsy procedures.

Less than half of the participants responded that the removal of tissue by laser or electrosurgery can introduce artefacts or tissue distortion. Heat produced by electrosurgery and laser surgery results in a fulguration artefact, which alters the epithelium and connective tissues. In fulguration artefact, epithelial cells appear to be separated from one another, and their nuclei show signs of hyperchromatism, spindled and palisaded structure.^{11,21-23} These alterations mislead the lesion's histology because they resemble the presence of epithelial dysplasia since margins are crucial in cases of malignancy, invasion, or pre-malignancy.²⁴ These changes may modify both the diagnosis and the appropriate course of treatment.

More than three-fourths of the interns responded that the volume of the fixative should be two-times the volume of the sample taken. Since tissue autolysis occurs quickly following resection, the biopsy specimen should be put in a fixative solution right away.^{13,25} At least 10 times the volume of the tissue samples should be used as fixative for the biopsy specimen.²⁶ The clinicians frequently overlook this crucial component of biopsies. When tissue is not properly maintained, it creates numerous artefacts that make it difficult for the pathologist to make an accurate diagnosis.²⁷⁻²⁹ Surprisingly, more than one fourth of the dental interns believed that the specimen can be fixed in normal saline and similar findings were reported in other studies done on general dental practitioners.^{7,30-32} Unfortunately using saline as a fixative has negative impact on tissue and produces artefact in the tissue lead to inconclusive or not appropriate diagnosis, maybe prompting the doctor to do another biopsy, adding to the patient's distress.³⁰

Six out of ten responded that biopsy specimens shrink after formalin fixation. If the specimen is too small, such as a thin strip of oral mucosa, the tissue will curl and flex as a result of the formalin fixation process and it will be challenging to position the specimen correctly during the embedding process.²⁸ This may lead to difficulty in making histological diagnosis.

We have seen throughout time how quickly dentistry is expanding and making new advancements each day. But we are not confident when it comes to oral biopsy, which is in

fact the gold standard for the detection/diagnosis of oral cancer and other oral diseases. Many conferences relating to various dental procedures have been held by various organizations, but few have been arranged for fundamental procedures like biopsy. Even during the COVID era, dental education has continued unabatedly in the form of online webinars, but only a small percentage of these sessions were observed to concentrate on the technical aspects of biopsy procedures.³² Oral cancer and oral potentially malignant lesions are of great concern in our country. The length and quality of patients' lives will undoubtedly be improved by early and prompt diagnosis which is possible only if the future dentists have adequate knowledge regarding biopsy procedure.

Present study revealed that dental interns have fair understanding and knowledge regarding oral biopsy procedure and still lack a few crucial perspectives regarding biopsy fixation and handling. Oral biopsy is the part of undergraduate curriculum, therefore dental interns must not only know where, when and how to perform the oral biopsy, the preservation of the tissue and also the ability to manage the subsequent sample is important. Considering the small sample size, the results may not be generalizable to the entire population of dental interns in Nepal. However, our findings highlighted the need for knowledge improvement in this area.

CONCLUSION

Dental interns have a good understanding of oral biopsy. However, the knowledge of the interns highlighted the need for further training programs and curriculum modification.

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CONFLICT OF INTEREST

No conflict of interest

FINANCIAL DISCLOSURE

None declared



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