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## CORRESPONDING AUTHOR:

## Neetu Jain

Senior Resident, Department of Oral Pathology, College of Dental Surgery, B.P. Koirala, Institute of Health Sciences, Nepal.  
Email: Drneetujain252@gmail.com  
Orcid: <https://orcid.org/0000-0003-3638-5849>

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## A Visualization Towards Oral Histology and Pathology Practical Classes - Existing Scenario and Imminent Trends

Neetu Jain<sup>1</sup>, Shashi Keshwar<sup>2</sup>, Ashish Shrestha<sup>3</sup>, Navin Agrawal<sup>4</sup>

<sup>1</sup> Senior Resident, Department of Oral Pathology, College of Dental Surgery, B.P. Koirala Institute of Health Sciences, Nepal.

<sup>2</sup> Assistant Professor, Department of Oral Pathology, College of Dental Surgery, B.P. Koirala Institute of Health Sciences, Nepal.

<sup>3</sup> Additional Professor and Head, Department of Oral Pathology, College of Dental Surgery, B.P. Koirala Institute of Health Sciences, Nepal.

<sup>4</sup> Additional professor, Department of conservative dentistry and endodontics, B.P. Koirala Institute of Health Sciences, Nepal.

### ABSTRACT

**Introduction:** Detailed knowledge is necessary in order to use dental anatomy, histology, and pathology in academic and clinical settings. Despite a competent, uniform academic curriculum and a passable infrastructure, there is still a disconnect between student comprehension and teacher preparation.

**Objective:** To evaluate the difficulties dental students have learning the subject.

**Methodology:** A cross-sectional survey was conducted among Students at College of Dental Surgery, In B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. A semi-structured questionnaire was used to collect the socio-demographic data and to understand students' interest in oral histology and oral pathology, to understand the difficulties encountered in slide identification and operating the microscope.

**Results:** Out of 178 students, 161 participated in the study giving a response rate of 90.44%. Overall result shows a maximum positive response suggesting most of the students regularly attend classes and finish their assigned tasks. Here data suggests a mixed response, with some students having difficulty in slide identification and remembering the features although the students are quite comfortable with the use of microscopes.

**Conclusion:** Understanding the slide and using the microscope effectively are a few of the difficulties that students encounter in oral biology and oral pathology. To improve student comprehension and proficiency in these areas, targeted interventions are necessary, as this study highlights these challenges.

### INTRODUCTION

Dental specialists in oral pathology identify and treat diseases and conditions of the mouth, oral cavity, and jaw. It is concerning how oral pathology and oral histology are currently being studied.<sup>1</sup> Despite all of the most recent improvements in books, the internet, and conferences, there are still gaps in students' knowledge and enthusiasm for the topic.<sup>1</sup> Dentistry students are adept at offering distinctive information about the value of the dentistry program.<sup>2</sup> The main goal of dental education is to improve students' talents and skills so that they can develop into more knowledgeable graduates.<sup>2</sup> The contemporary focus has been on learning and learners rather than teaching and teachers, which appears to be centred on student welfare and has transferred the paradigm from teachers to students.<sup>3</sup> The Department of oral pathology is essential to preparing students for the diverse and distinct profession of dentistry. Students are professionally prepared to diagnose and treat oral diseases in this field, which will facilitate the speedy critical link between oral and systemic diseases and combine knowledge of histological diagnosis with clinical diagnosis and treatment outcomes.<sup>4</sup> There will be a variety of pupils in a class of dental students, some of them will be more advanced in their understanding of the subject than others. Without a doubt, perfectionism in this discipline is attained by putting in ever-increasing amounts of time

in front of a microscope in the classroom.<sup>1</sup> Despite a competent, uniform academic curriculum and a passable infrastructure, there is still a disconnect between student comprehension and teacher preparation, so changes must be made as time advances. As far as we are aware, not much studies have been conducted in this area. As there is paucity of data degrading the challenges faced by dental students. So, with the help of this study we tried to evaluate the difficulties dental students have learning the subject.

## METHODOLOGY

Cross-sectional research was carried out on undergraduate dental students (2<sup>nd</sup> year, 3<sup>rd</sup> year, 4<sup>th</sup> year, 5<sup>th</sup> year and interns) in BPKIHS, after taking their consent. The convenience census method was used to determine the sample size, which was 178. Based on the literature reviews and the advice of the experts, a semi-structured proforma was created.<sup>1</sup>

It included socio-demographic information and closed-ended questions to gauge interest in the topic, grasp the meaning of the slide, and use the microscope. The questionnaire’s clarity was pilot tested among a 10% sample for validity and reliability, and those samples were excluded from the analysis which failed the validity and reliability test.

Visits were made to the lecture halls at the College of Dental Surgery to gather the data. Participants were informed of the study’s goal, and their written consent was obtained. On the same day, students were asked to fill the self-administered survey questions which fulfilled the objective of our study to evaluate the difficulties dental students have learning the subject. The completed questionnaire was reviewed again for accuracy. The questionnaire was scored as “missing response” if any blanks

were left on it. To protect the participants’ privacy, no personal information was published.

The BPKIHS Institutional Review Committee (IRC/2134/021) gave the study its seal of approval. The Statistical Package for Social Sciences (Version 22.0) was used to construct descriptive statistics after the data were entered in Microsoft Excel 2010.

## RESULTS

The survey was completed by 161 out of 178 students, yielding a 90.44% response rate. Most of the students were between 20 and 26 years old, with an average age of 22.6 years. The number of students varied from academic year to academic year, and the largest response came from female applicants (Table 1)

**Table 1: Socio-demographic details of the students (n=161)**

Variables	Frequency (%)	
Age Group (Years)	17-21	75 (46.5)
	22-26	86 (53.4)
Gender	Male	64 (39.7)
	Female	97 (60.2)
Academic Year	Second-Year	42 (26.1)
	Third- Year	35 (21.7)
	Fourth- Year	23 (14.3)
	Fifth- Year	37 (23)
	Interns	24 (14.9)

Emphasizing the interest of students in the subject, the results show a maximum positive response, suggesting that most students regularly attend classes and complete their assigned tasks. (Table 2)

**Table 2: Questions related to the interest of students in the subject**

Questions	Frequency (%)	
1. Have you ever explored the oral pathology department?	Missing response	01 (0.6)
	a. Only the student laboratory area	73 (45.3)
	b. Entire department including tissue processing laboratory and reporting room	87 (54.0)
2. Do you regularly attend the subject lectures?	Missing response	00 (0.0)
	a. Yes	121 (75.2)
	b. No	02 (1.9)
	c. Mostly	37 (23)
3. How often do you read the topic before you see the slide?	Missing response	
	a. Always	34 (21.1)
	b. Sometimes	110 (68.3)
	c. Never	17 (10.6)
4. Do you use oral histology/ oral pathology atlas to understand the slide?	Missing response	01 (0.6)
	a. Yes	88 (54.7)
	b. No	26 (16.1)
	c. Sometimes	46 (28.6)

5. Do you approach your teachers to explain, in case of difficulties?	Missing response	00 (0.0)
	a. Yes	97 (60.2)
	b. No	12 (7.5)
	c. Sometimes	52 (32.3)
6. Do you attend the revision practical classes for the slides?	Missing response	2 (1.2)
	a. Yes	133 (82.6)
	b. No	07 (4.3)
	c. Sometimes	19 (11.8)
7. How do you prepare the log books for your classes?	Missing response	00 (0.0)
	a. Write and draw from standard textbooks	86 (53.4)
	b. Copy from colleagues	14 (8.7)
	c. Both	61 (37.9)
8. How often do you practice Oral histology/ Oral pathology diagrams?	Missing response	01 (0.6)
	a. Almost daily	36 (22.4)
	b. Just before practical exams	114 (70.8)
	d. Rarely	10 (6.2)
9. What do you think about making the diagrams in rough and fair notebooks?	Missing response	00 (0.0)
	a. Very tedious	39 (24.2)
	b. Provides more practice hence helpful for slide identification	82 (50.9)
	c. Both	40 (24.8)

Here there is an exploration of potential challenges encountered in comprehending the material presented. The data indicates a mixed response, with some students facing difficulties in identifying slides and recalling their features (Table 3)

**Table 3: Questions concerning understanding the slide**

	Questions	Frequency (%)
1. Mention the Number of slides on average, should be focused in one practical class?	Missing response	00 (0.0)
	a. 2	39 (24.2)
	b. 4	90 (55.9)
	c. 6	32 (19.9)
2. Mention the way how you identify the slide?	Missing response	01 (0.6)
	a. Remembering some identification marks	67 (41.6)
	b. Following the ideal process of scanning the slide and visualizing it	14 (8.7)
	c. Both ways	79 (49.1)
3. Can you identify various tissue structures stained using haematoxylin and eosin stain?	Missing response	00 (0.0)
	a. Yes	77 (47.8)
	b. No	16 (9.9)
	c. Sometimes	68 (42.2)
4. Can you remember the features on a slide after seeing it for the first time?	Missing response	00 (0.0)
	a. Yes always	25 (15.5)
	b. Sometimes	104 (64.6)
	c. Rarely	32 (19.9)
5. Did you ever feel that the slides are not properly stained (faded)?	Missing response	00 (0.0)
	a. Yes	98 (60.9)
	b. No	29 (18.0)
	c. No idea	34 (21.1)

6. Do you understand what the facilitator explains about the slides which are focused?	Missing response	01 (0.6)
	a. Mostly	96 (59.6)
	b. Sometimes	61 (37.9)
	c. Never	03 (1.9)
7. Can you correlate the diagrams and the respective focused slide?	Missing response	00 (0.0)
	a. Yes	113 (70.2)
	b. No	08 (5.0)
	c. Sometimes	40 (24.8)

Examining Table 4, we can see that it answers queries about using microscopes. The findings indicate that students exhibit a high level of comfort and proficiency in operating microscopes.

**Table 4: Questions about operating the microscope**

Questions		Frequency (%)
Is light microscope convenient for you to study the slides?	Missing response	00 (0.0)
	a. Yes	141(87.6)
	b. No	20(12.4)
Do you adjust the various magnifications used in the light microscopes?	Missing response	01(0.6)
	a. Yes	125(77.6)
	b. No	35(21.7)
Can you adjust the microscope focus on your own?	Missing response	00 (0.0)
	a. Yes	135(83.9)
	b. No	26(16.1)
Do you try to use both eyes while using a binocular microscope?	Missing response	01(0.6)
	a. Yes	112(69.6)
	b. No	48(29.8)
Do you know how to focus a slide using the stage of the microscope?	Missing response	01(0.6)
	a. Yes	121(75.2)
	b. No	39(24.2)
Do you know how to adjust the light of a microscope?	Missing response	00(0.0)
	a. Yes	132(82)
	b. No	29(18)
Mention the main difficulty/difficulties you face about the subject.	Missing response	00(0.0)
	a. Operating the microscope	22(13.7)
	b. Identification of the slide	37(23.0)
	c. Remembering during the exams	40(24.8)
	All of the above	62 (38.5)

## DISCUSSION

A dental graduate’s solid foundation is built on knowledge and comprehension of microscopic pathological diseases. Students must take an interest in oral pathology because of this. The training of students in direct patient care as well as their preparation for jobs in hospitals and colleges are two of the main responsibilities of the oral pathology branch.<sup>5</sup> Dental

schools must emphasize this topic at the undergraduate level for the students to value it throughout the rest of their education and to reap its full benefits.<sup>4</sup> Our study’s goal was to determine the challenges/problems faced by undergraduates in identifying pathological microscopic slides, operating a microscope, and their interest in the subject to enhance their comprehension. Our study comprises a decent number of participants, out of which 161 (90.44%) responded. A majority of the students have responded positively that they have explored the entire oral pathology department (54%) and regularly attend lectures (75.2%) and approach their teachers in case of difficulties (60.2%), whereas 82.6% of them attend the revision practical classes for the slides. Although a great number of students regularly attend the lecture but majority of them attend the revision classes just prior to the exams, this indicates the students took more interest in the revision classes conducted before the exams which are suggestive of students’ interest more towards cracking the exam rather than understanding the subject.

On asking the students, how often do you read the topic before you see the slide and do you use oral histology/ oral pathology atlas to understand the slide? 68.3% of the students replied that they read only sometimes whereas 54.7% of students use oral histology/ oral pathology atlas to understand the slide. On enquiring about how you prepare the log books for your classes, how often you practice Oral histology/ Oral pathology diagrams and what do you think about making the diagrams in rough and fair notebooks? The majority of the students answered that they draw from standard textbooks (53.4%), and think (50.9%) that this will provide more practice and hence helpful for slide identification but again majority of them practice only during the practical exams (70.8%). From the above results, it can be clearly understood that reading the topic before seeing the slide and following the atlas can be valuable in understanding the topic, also drawing the diagrams helps in better practice but most of the students prefer practicing just before the exams, suggesting their interest to be more exam-oriented rather than taking interest in the subject. As per literature incorporation of multimedia can gain more students interest in the subject.<sup>6</sup>

While questioning about the slides 55.9% of students suggested that 4 slides on average, should be focused in one practical class. 47.8% can identify various tissue structures stained using hematoxylin and eosin stain, 59.6% can understand what the facilitator explains about the slides which are focused and 70.2% can correlate between the diagrams and the respective focused slide. Only 15.5% can remember the features on a slide after

seeing it for the first time whereas 60.9% felt that sometimes the slides are not properly stained (faded) and 41.6% of the students identify the slide by remembering some identification marks on the slide.

On questioning about the convenience of use of the microscope, 87.6% found the light microscope convenient to study the slides, 77.6% can adjust the various magnifications used in the light microscopes, 83.9% can adjust the microscope focus on their own, 69.6% try to use both the eyes while using a binocular microscope, 75.2% know how to focus a slide using the stage of the microscope, 82% know how to adjust the light of a microscope but 38.5% on asking about the main difficulty/difficulties you face about the subject stated that they experience all such problems like in operating the microscope, identification of slide and remembering during the exams. From the above data, a positive result is noted but still, it seems that numerous students are facing problems in slide identification, correlating it with the actual content, remembering it during the exams, and also operating the microscope.

Despite this, Schifferdecker et al. recently emphasized the significance of some outstanding issues, including the need for staff adoption and development of curriculum as well as the best ways to incorporate computer-assisted learning.<sup>7</sup> Different forms of computer-aided learning have been incorporated into the veterinary medicine curriculum steadily since the early 1990s.<sup>8</sup> The use of virtual microscopy, using digital images, has become more realistic in recent years as computing power has increased and become more affordable. A previous study compared teaching histology to medical students using traditional microscopes and glass slides to teaching with digital slides, while Dee and Meyerholz's description of teaching medical pathology in detail the use of virtual microscopy.<sup>9-10</sup> The effective use of such techniques in teaching veterinary students has been documented in several later reports, including those for first-year histology, cytopathology, and histopathology.<sup>11</sup> Each of these studies found that students had an overall positive reaction to virtual microscopy and highlighted several perceived benefits over traditional microscopy, such as image clarity, accessibility, collaborative learning, and effective time management.<sup>12</sup>

## CONCLUSION

Students face various challenges in the learning process of oral biology and oral pathology, such as understanding the slides, correlating them with the content, and operating the microscope efficiently. Present study sheds light on these difficulties and underscores the need for targeted interventions to enhance student comprehension and proficiency in these areas.

**LIMITATION OF THE STUDY:** The study would have been more valuable if students from more colleges in Nepal have participated.

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