

# Perception of Tooth Carving among Undergraduate Dental Students at a Tertiary Hospital in Eastern Nepal

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## ABSTRACT

**Introduction:** Dental anatomy is a basic course in Bachelor of Dental Surgery (BDS) curriculum that is fundamental for establishing a solid dentistry background and the necessary knowledge to all aspects of dental practice. Tooth carving is an integral part of teaching oral anatomy.

**Objective:** To assess undergraduate students' perception regarding tooth carving exercise.

**Materials and Method:** A cross-sectional descriptive study was conducted during March-April 2020 among 116 undergraduate dental students at College of Dental Surgery, BP Koirala Institute of Health Sciences, Dharan, Nepal. Convenience sampling method was used. A semi-structured proforma consisting of sociodemographic data and questions on perception of tooth carving and the feedback was prepared. The questions were closed-ended having five-point Likert scale. Google form was prepared and the link was emailed to the participants. Ethical clearance was obtained from the Institutional Review Committee. Descriptive statistics like mean, standard deviation, percentage and frequency were calculated using Statistical Package for Social Sciences (version 22.0).

**Result:** Out of 116 students, 82 (70.7%) strongly agreed that the carving exercise helped a lot to understand tooth morphology. Seventy-two (62.1%) students strongly agreed that the carving exercise helped better in tooth identification in clinics. Few students commented on incorporation of carving tutorial videos in carving session.

**Conclusion:** Tooth carving exercise is unrivalled for teaching tooth anatomy to undergraduate students. This module appears to help BDS students to learn dental anatomy efficiently. Further introducing new methods or teaching technique is required to make it more interesting to the students.

**Keywords:** Dental; feedback; students.

## INTRODUCTION

Dental anatomy or oral anatomy is a science which concentrates mainly on the study of the anatomical and morphological characteristics of human dentition. It also deals with their positions and relationships with each other and

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with the surrounding structures. It is, therefore, a fundamental course for establishing a solid dental background.<sup>1,2</sup>

Oral anatomy is taught in the preclinical years that provides essential information which students will later apply in their dental practice. It introduces students to the surface outline of the oral cavity, the external and internal morphology of individual primary and permanent tooth and their relationship within and between the maxillary and mandibular arches.<sup>3,4</sup> Most dental schools continue to teach oral anatomy in two-phase manner. In first phase, lectures are taken and in the second phase to develop students' psychomotor skills a combination of two-dimensional drawing projects and exercises to carve teeth from oversized wax blocks are done.<sup>5</sup> Although carving exercises are focused on training manual dexterity, these established methods reveal some weak points that can cause frustration in both students and faculty.<sup>6</sup> The objective of the study was to assess undergraduate dental students' perception regarding tooth carving exercise and the need for further improvement of the course.

## MATERIALS AND METHOD

A web-based cross-sectional descriptive study was conducted among undergraduate dental students studying Bachelor of Dental Surgery (BDS) at College of Dental Surgery, BP Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. The study was conducted during March-April 2020. The students who were in third year, fourth year and fifth year and intern were enrolled in the study as they have passed their second year and familiar to the carving exercise. The sample size was calculated with reference to a study conducted by Oweis et al.<sup>7</sup> where 80.6% students agreed that supervising staff members were helpful in the carving sessions. The study considered 95% confidence interval to estimate the sample size.  $(P)=80.6$ ,  $Q=100-p=19.4$ ,  $L=10\%$  of  $P=8.06$  and  $Z=1.96$ .

Now using the formula to calculate sample size,

$$n = Z^2 \times P \times Q / L^2$$
$$= 93$$

Adding 10% as non-responder, the final sample size was 102. Convenience sampling method was used.

A semi-structured questionnaire was prepared based on the literature reviews.<sup>7,8</sup> It consisted of three sections; the first section comprised of sociodemographic data, the second section comprised of eleven closed-ended questions having response on a five-point Likert scale. The third section consisted of students' comments and feedback. The questionnaire was prepared using Google forms via docs.google.com/forms and the link was emailed to the enrolled participants. The questionnaire was sent to the three subject experts for its validation and the questionnaire was modified as per the suggestions. A pilot study was conducted among 10% of the total sample to see the validity, common understanding and interpretation of the questions by the study population. The pilot study responses were excluded from the main analysis. Cronbach's alpha was 0.79 indicating an acceptable level of reliability of the data collection tool. To maintain the confidentiality of the students, faculty from a different department was involved to send the link and receive the response of the questionnaire through email. No personal information of the participants were collected. Ethical clearance was obtained from the Institutional Review Committee, BPKIHS (148/075/076-IRC).

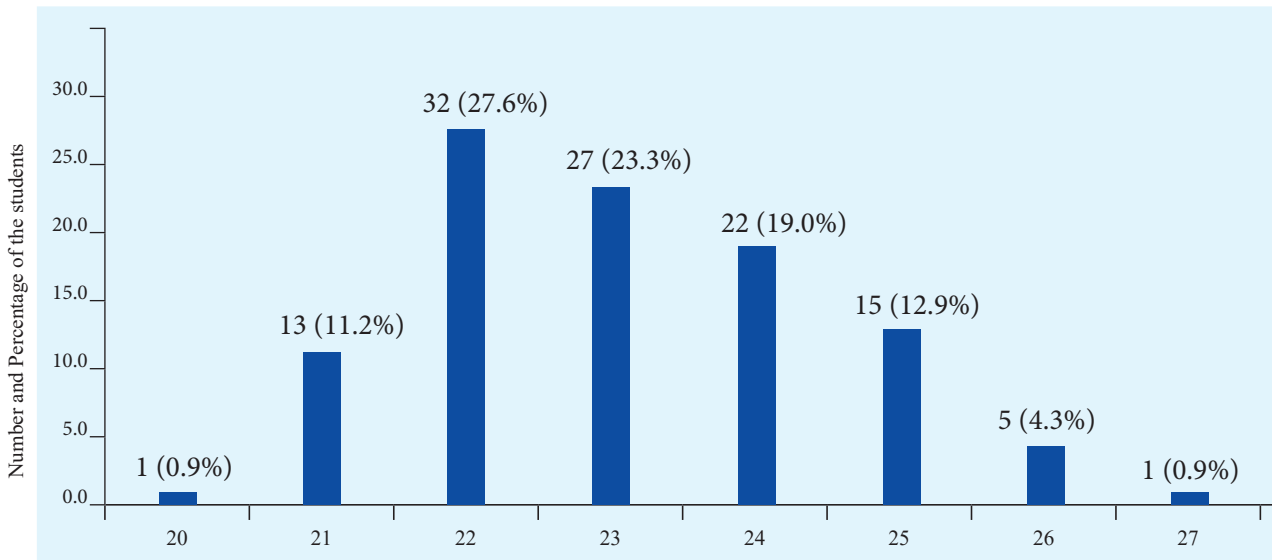
The filled questionnaires were extracted from the Google Forms and exported to Microsoft Excel 2010. Descriptive statistics mean, standard deviation, frequency and percentage were calculated using IBM SPSS Statistics for Windows, version 22 (IBM Corp., Armonk, N.Y., USA).

## RESULT

The Google link was sent to 180 students and 116 responded giving a response rate of 64.4%. Out of 116, 75 (64.7%) students were female and 37 (31.9%) were intern. One hundred and ten students (94.8%) belonged to the age group 20 – 25 year (Table 1). The mean age was  $23.11 \pm 1.52$  years. Most of the students 32 (27.6%) were 22 years of age (Figure 1).

**Table 1: Sociodemographic characteristics of the students (n=116).**

Variables	Category	Number of students (%)
Gender	Male	41 (35.3)
	Female	75 (64.7)
Age category (years)	20 – 25	110 (94.8)
	26 – 30	6 (5.2)
Academic year	Third	19 (16.4)
	Fourth	26 (22.4)
	Fifth	34 (29.3)
	Intern	37 (31.9)



**Figure 1: Age of the students (n=116).**

**Table 2: Perception of the students towards carving (n=116).**

S.N.	Questions on the perception of tooth carving	Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly disagree n (%)
1	Allotment of time for tooth carving is sufficient.	30 (25.9)	74 (63.8)	10 (8.6)	1 (0.9)	1 (0.9)
2	The carving exercise helped me grasp the instrument's proper grip.	67 (57.8)	46 (39.7)	3 (2.6)	-	-
3	The carving exercise helped me develop my dexterity by hand.	52 (44.8)	58 (50)	5 (4.3)	1 (0.9)	-
4	White wax blocks used for carving exercise was easy to handle.	13 (11.2)	58 (50)	29 (25)	15 (12.9)	1 (0.9)
5	The space in LABEX (laboratory exercise) provided was good for performing the carving.	60 (51.7)	51 (44)	1 (0.9)	4 (3.4)	-
6	The tutors were very cooperative and helpful in the carving sessions.	68 (58.6)	44 (37.9)	4 (3.4)	-	-
7	The carving exercise helped me a lot to understand tooth morphology.	82 (70.7)	32 (27.6)	1 (0.9)	1 (0.9)	-
8	The carving exercise helped me better in tooth identification in clinics.	72 (62.1)	38 (32.8)	5 (4.3)	1 (0.9)	-
9	The carving helped me in restorative dentistry.	35 (30.2)	61 (52.6)	17 (14.7)	3 (2.6)	-
10	The carving helped me in refining my clinical skills.	30 (25.9)	73 (62.9)	10 (8.6)	3 (2.6)	-
11	I found the carving exercises very useful.	55 (47.4)	54 (46.6)	6 (5.2)	4 (0.9)	-

Majority of the students 82 (70.7%) strongly agreed that the carving exercise helped them a lot to understand tooth morphology. Seventy-two (62.1%) students strongly agreed that the carving exercise helped them better in tooth identification in clinics (Table 2).

**Table 3: Feedback and comments of the students towards carving (n=42).**

Theme	Student's comments/feedback
Acquisition of clinical skill	Tooth carving is helpful in clinical dentistry.
	Carving is very effective in theoretical, practical, and clinical manner.
Acquisition of tooth anatomy	Carving help to understand tooth morphology and identification.
	Self-carved things are remembered for longer period.
Learning environment	Supportive teachers and friendly learning experiences throughout the years.
	Good demonstration made carving so easy.
	Humid environment in summer hampers the carving.

Student's comments and feedbacks are presented as thematic data in Table 3. Out of the 116, 42 (36.2%) students provided their comments and feedbacks. All the comments were focused on praising or criticising the existing carving exercise, few of them came with new ideas of teaching the carving such as step by step videos of each tooth carving made so that it would help the beginners to practice much effectively and efficiently. Majority of the students found carving exercise helpful in understanding tooth morphology and identification. Many commended tutor's knowledge and behaviour. Some commented that it was tedious and irritating at that time but it helped a lot during clinical practice. Some commented about the group should be smaller for carving demonstration. Few commented on modifying laboratory as it becomes very difficult to carve in hot and humid weather. Few commented that carving was stressful.

## DISCUSSION

The basic requirement for commencement of clinical skills training in dentistry includes knowledge and identification of individual tooth along with the skill to recreate these anatomical variations clinically.<sup>9</sup> Knowledge of tooth morphology is also very important in prevention of various dental diseases, endodontic treatments, forensics and anthropological studies.<sup>2,10,11</sup> Therefore, dental anatomy is considered a foundational course in dentistry that helps to link all these specialities together. Most dental schools use lectures for knowledge component and a combination of anatomical drawings and wax carvings of teeth to develop psychomotor skills of students.<sup>1</sup>

The tooth anatomy course at College of Dental Surgery, BPKIHS is taught through lectures, drawing two-dimensional tooth diagrams and

carving tooth anatomy by oversize wax block after demonstration from the tutor. In this study, we aimed to find out student's perception regarding carving exercise and its usefulness in their practice, so that steps should be taken to improve it.

The first part of the closed-ended questionnaire was responded by all participants but only one-third participants responded in the open-ended comment section. The reason behind this low response might be because writing comment needs critical thinking and effort or they might feel that all the things are good during carving exercise or the most of the things they could think may already have been covered in the questionnaire or there might be fear of confidentiality.

Majority of the students (94.8%) agreed that carving exercise helped them developed their dexterity by hand. This was higher than the finding reported by Oweis et al. (67%).<sup>7</sup> Similarly, almost all students (98.3%) agreed that carving exercise helped them a lot to understand tooth morphology. This was higher than the finding reported by Oweis et al. (88.2%) and Chaulagain et al. (94.2%).<sup>7,12</sup> Manual dexterity and tooth morphology is an important part of dentistry as the dental professionals are more dedicated towards preservation of human teeth. Therefore, they should have a clear understanding regarding the fundamental and characteristic features of dental morphology and they must develop enough manual dexterity to reproduce any part of the dental system and also maintain a perfect correlation with the whole.<sup>13</sup> Drawing and dental carving are acknowledged as an objective and practical methods for teaching dental anatomy.<sup>3</sup> According to Obrez et al. drawing of tooth has its restraint such as portraying three-dimensional structure of tooth morphology in two-dimensional frame while wax carving of teeth that differ significantly from real size is a very difficult task and have questionable

value in terms of the skills learned in the context of clinical practice.<sup>1</sup>

In BPKIHS, the practical part of the dental anatomy starts with the drawing of two-dimension diagram of teeth and then carving a full real dimension tooth from oversize wax block after getting demonstration from the tutor which is helpful later to recall and apply in actual patient care. The students found the carving exercise useful and it improved their knowledge about the anatomy of teeth and their manual skills which is in contrast to some authors' opinion that carving has questionable value in terms of the skills learned<sup>1</sup> and should be dropped from undergraduate dental curriculum.<sup>14,15</sup>

Most of the students (94.9%) responded that carving exercise helped them better in tooth identification in clinics. More than two-third students (88.8%) agreed that carving helped them in restorative dentistry. This was higher than the findings reported by Chaulagain et al. (73.1%) and Nayak et al. (62.6%).<sup>8,12</sup> Through carving exercise of teeth, the dental student starts developing psychomotor skills for restoring the teeth to proper form and function along with that they gain knowledge to identify teeth, recognise and diagnose tooth anomalies, and treat or manage dental pathology.<sup>1</sup> Dental professional requires a good knowledge of teeth morphology as in their day to day practice they have to restructure the dental tissue and reinstate function. Almost all of the students believed that tutors were very cooperative and helpful in the carving sessions. A good and effective cooperation between instructor and student create a better learning environment. Guidance, demonstrations, and positive interactions with instructors are important for learning.<sup>16,17</sup>

Few students suggested in the comment section that step by step videos (time-lapsed) of each tooth carving would help the beginners to practice much effectively. Demonstration and observation create a great deal of learning opportunity. Watching another practitioner perform treatment can be incredibly didactic both before and after learning

the procedure.<sup>17,18</sup> Learning by video is also a good option as it removes the time restraint faced by students in demonstration class.

The participants of the current study felt that although carving was difficult and stressful in the beginning but it provided them the necessary skills which are must for practising dentistry. This gave them a sense of feeling that carving exercise has a great value in acquiring clinical knowledge and skills. The skills learnt by the participants are far more worthy than the tensity faced during carving.

The current study emphasised that carving exercises should be continued as part of the dental anatomy course along with introducing a few new techniques or methods like video-based carving tutorial. We recommend that carving exercise of tooth unrivalled for teaching dental anatomy to undergraduate students.

The current study has some limitation. The study finding cannot be generalised as it was conducted at one centre only.

## CONCLUSION

The present study revealed that students have Pollyannaism tendency regarding tooth carving exercise. Students agreed that it helped to develop their manual dexterity, tooth identification knowledge and clinical skill which was one of the main objectives of carving exercise. This carving learning module appears to help dental students to learn dental anatomy efficiently. Further introducing new methods or teaching technique is required to make it more interesting to the students.

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**Conflict of Interest:** None.



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