

Perception Regarding Tooth Carving using Wax Block among Dental Students in Kathmandu

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ABSTRACT

Introduction: Knowledge of dental anatomy is of utmost importance, without which professional dental practice may not be successful. Teaching dental anatomy to students in majority of colleges is usually done through lectures, extracted natural teeth, assisted with wax carving in practical sessions.

Objective: To analyse the perceived importance of tooth carving using a wax block during their BDS curriculum.

Materials and Method: A cross-sectional descriptive study was designed involving dental students studying in different dental colleges in Kathmandu. Self-administered questionnaires were used to collect the data. The results were analysed for descriptive statistics using the Statistical Package for the Social Sciences (SPSS) 16 software.

Result: A total of 260 dental students participated in this study. Among them 255 (98.1%) did tooth carving in their practical session of oral anatomy. Mostly they used wax blocks for carving. Two-hundred thirteen (81.9%) of respondents suggested the need of live demonstration assisted with videos to carve teeth better.

Conclusion: Although learning dental anatomy by carving of teeth using wax block is an age-old, time-tested standard method and would definitely help to correctly identify and replicate the morphology of teeth both during their student life and professional practice. Newer, more interesting, innovative, interactive and clinically relevant adjuvant teaching, learning methods such as computer-aided learning and others should also be considered which help the students learn better and with ease.

Keywords: Carving; dental anatomy; tooth morphology.

INTRODUCTION

Dental anatomy deals with the anatomical and morphological study of human dentition (both permanent and deciduous) along with their position and relationship with associated oral structures.¹ Knowledge of tooth anatomy is fundamental prerequisite in the preclinical dental curriculum for

providing knowledge that are essential in future dental practice² and for correct identification of the teeth.³ Moreover, maintaining normal tooth anatomy is very important during restorative treatment.⁴

The various methods to study tooth anatomy are through lectures, drawing of the particular teeth, and carving the teeth using wax model. Tooth carving

hence, is an important preclinical exercise related to Oral Anatomy/Oral Biology to learn dental anatomy in almost all dental colleges in Nepal.

Although tooth carving using wax block until now is a mandatory practical exercise to learn dental anatomy, differences in opinion regarding tooth carving exists among dental students who have already completed the tooth carving phase and the dental practitioners. Dentists do express positive opinion regarding the significance of tooth carving in daily dental practice as most of them think that these exercises do have relevance in various dental laboratory works. Hence, the purpose of this study was to analyse the dental students' perception of tooth carving.

MATERIALS AND METHOD

This was a questionnaire based cross-sectional descriptive study which was conducted among the undergraduate dental students of five dental colleges of Kathmandu, Nepal. The participants were from the third and fourth year dental students of various colleges affiliated to Tribhuvan University (TU) and second to fourth year students of different colleges affiliated to Kathmandu University (KU). These were the students who had already completed their preclinical tooth carving exercises either in the first or the second academic year of the Bachelor of Dental Surgery (BDS) curriculum. The study was conducted for a period of four months starting from September 2018 to December 2018, after obtaining the ethical clearance from Institutional Review Committee of KIST Medical College and Hospital (IRC No: 2075/76/46).

For data collection, self-administered questionnaires consisting of 14 questions related to the perception of tooth carving were used. Participation in this study was entirely voluntary and anonymity of the participants was maintained. The sample size was calculated to be 228 and convenience sampling technique was used. A total number of 300 questionnaires were distributed among the dental students in the five dental colleges in Kathmandu. Only 272 questionnaires response was received.

Out of total received, five questionnaires which were incompletely filled and seven questionnaires filled at multiple times were rejected. The students who gave written consent and those questionnaires which were completely filled were only included in the study. So, a total of 260 responses were entered in the Microsoft Excel. The Statistical Package for the Social Sciences (SPSS) 16 software was utilised to calculate the descriptive statistics.

RESULT

A total of 300 questionnaires were distributed among the dental students, only 260 fully filled questionnaires returned (response rate 86.7%) and they were included in the final analysis. Among the participants in the study 56 (21.5%) were males and 204 (78.5%) were females.

A majority of dental students 255 (98.1%) practiced tooth carving using wax block as a part of their oral anatomy/biology practical. Only 50 (19.2%) carved only full permanent teeth and more than half 147 (56.5%) had carved only few permanent teeth while both permanent and deciduous teeth were carved by 63 (24.2%) participants. Almost 99% of students used wax block for tooth carving. More than 90% students agreed that tooth carving helped them to understand tooth anatomy better. More than 70% of students agreed that carving was helpful in restorative dentistry, in understanding dental occlusion and improving dental skills (Table 1).

A total of 152 (58.8%) of dental students believed that time allotted for carving of tooth in undergraduate (UG) dental syllabus was relevant. While 215 (82.7%) recommended to continue it in UG dental syllabus, 182 (70%) of respondents suggested it to be removed as an assessment criterion from university exams.

Nearly two-thirds (74.2%) thought computer software with image simulation will better help in learning tooth anatomy. In total 213 (81.9%) believed live demonstration and substitution with videos would have been helpful in the process of carving (Table 1).

Table 1: Perception of dental students for tooth carving.

Questions	Response	Frequency (Percent)
Did you practice tooth carving using wax block as a learning exercise for dental morphology as part of your oral anatomy/biology practical session.	Yes	255 (98.1%)
	No	2 (0.8%)
	Don't know	3 (1.2%)
Did you carve complete set of teeth?	Only full permanent set	50 (19.2%)
	Both deciduous and permanent dentitions full set	63 (24.2%)
	Only few permanent teeth	147 (56.5%)
Which part of tooth anatomy do you think is important?	Crown	42 (16.2%)
	Root	2 (0.8%)
	Both	215 (82.7%)
	None	1 (0.4%)
Which materials did you use to practice tooth carving	Wax block	257 (98.8%)
	Soap	3 (1.2%)
Has tooth carving exercises helped you better understand tooth morphology?	Yes	245 (94.2%)
	No	11 (4.2%)
	Don't know	4 (1.5%)
Has the carving session helped you familiarise with lab instruments and understand the proper grip of instruments?	Yes	213 (81.9%)
	No	34 (13.1%)
	Don't know	13 (5%)
Was the tooth carving useful in restorative dentistry?	Yes	190 (73.1%)
	No	34 (13.1%)
	Don't know	36 (13.8%)
Carving of tooth helped you in understand dental occlusion?	Yes	194 (74.6%)
	No	33 (12.7%)
	Don't know	33 (12.7%)
Carving has helped me to improve my clinical skills?	Yes	191 (73.5%)
	No	28 (10.8%)
	Don't know	41 (15.8%)
Is the total time allotted for tooth carving in UG dental syllabus relevant?	Yes	152 (58.8%)
	No	78 (30%)
	Don't know	30 (11.5%)
Do you think carving should be continued in undergraduate dental syllabus?	Yes	215 (82.7%)
	No	34 (13.1%)
	Don't know	11 (4.2%)
Should carving be removed as an assessment parameter in university exams?	Yes	62 (28.3%)
	No	182 (70%)
	Don't know	16 (6.2%)
Do you think computer software with image simulation techniques will help in learning tooth anatomy better?	Yes	193 (74.2%)
	No	33 (12.7%)

DISCUSSION

Dentistry has long since been defined as an amalgamation of both art and science. Hence, to practise dentistry in a better way, one has to have both the skills of art and knowledge of science. Sound knowledge regarding tooth morphology, physiology, and occlusion is thus required in all the fields of dentistry. This knowledge and skills in turn, help to reproduce the lost structure or tooth or teeth as a whole especially in operative dentistry and prosthodontics.⁵

Most of the participants in our study responded that they have carved tooth as a part of oral anatomy/biology practical exercises in their undergraduate level. In Nepal, dental anatomy is taught to students in 2nd year under TU BDS curriculum and 1st Year under KU BDS curriculum. More than half respondents (56.5%) agreed that they carved only few permanent teeth, while 215 (82.7%) of respondents carved both crown as well as root, and 42 (16.2%) dental students carved only crown. But majority of the students suggested that carving of both crown and root was equally important which is in contrast to the recommendation by Sivapathasundharam that carving of root of tooth a waste of time, energy and has more chances of breakage of root during the examination.⁶

More than 90% of the students suggested that tooth carving exercises helped to learn tooth morphology better and easier. This finding is opposite to the suggestions made by some authors that tooth carving is waste of time, energy and waste of carving wax and should be discarded from UG dental syllabus.⁶⁻⁹

The traditional methods for teaching and learning dental anatomy includes lectures, books, tooth atlas, tooth carving, drawing of particular tooth, extracted natural tooth. In addition, the teaching can be further assisted with making of macro models of tooth to allow proper visualisation of tooth morphology and occlusion.^{10,11} We also follow the classic trends such as in the form of lectures and practical sessions involving drawing of particular tooth and carving of wax to form particular teeth. Among the total participants, 98.8% reported that they carried out tooth carving using a wax block.

Although traditional methods are time tested and widely used, teaching students regarding

tooth carving can also be assisted with the help of newer innovative technologies.¹² In our study three-fourth of the students agreed that computer software with image simulation would help them to learn tooth anatomy better. Digital atlases and use of computer-assisted learning methods can be boon to the teaching learning activities related to tooth anatomy. Nance et al. also suggested that merging both computer-assisted instruction with traditional laboratory-based carving methods enhanced students learning capacity. Computer-assisted instruction also allowed students to repeat the demonstration of technique when needed.^{12,13} In our study, nearly 82% of the students agreed on traditional method assisted with videos would have been helpful in carving of the tooth which is in accordance with the study published by Bogacki et al. who have also reported the utility of computer-assisted learning along with traditional lecture.¹⁴

Majority of the students suggested preclinical tooth carving exercises should be continued in BDS curriculum. However, most of them (70%) had an opinion that it should not be a part of an assessment tool to clear the university examination.

The limitation of the study was that the study was localised to Kathmandu valley so generalisation of the results from this study cannot be done.

CONCLUSION

Tooth carving exercises using wax block is important not only to study dental anatomy but also to practise eye-hand coordination. Knowledge of tooth morphology assisted with tooth carving exercises using wax block helps students to reproduce tooth morphology during amalgam and composite restorations. However, newer, more interesting, innovative, interactive and clinically relevant adjuvant teaching, learning methods such as computer-aided learning and others should also be considered which help the students learn better and with ease.

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Conflict of Interest: None.

REFERENCES

1. Oweis Y, Eriefej N, Eid RA. Students' Perceptions of Dental Anatomy Course at The University of Jordan. *Jordan Med J*. 2015;49(3):147-54.
2. Obrez A, Briggs C, Buckman J, Goldstein L, Lamb C, Knight WG. Teaching clinically relevant dental anatomy in the dental curriculum: description and assessment of an innovative module. *J Dent Educ*. 2011;75(6):797-804.
3. Lone M. Innovative strategies for teaching anatomy to dental students. PhD Thesis, University College Cork; 2018.
4. Eid RA, Ewan K, Foley J, Oweis Y, Jayasinghe J. Self-directed study and carving tooth models for learning tooth morphology: perceptions of students at the University of Aberdeen, Scotland. *J Dent Educ*. 2013;77(9):1147-53.
5. Patil PG. Tooth carving: a response. *Indian J Dent Res*. 2012;23(5):691-2.
6. Sivapathasundharam B. Tooth carving. *Indian J Dent Res*. 2008;19(3):181.
7. Ponniah I. Why tooth carving? *Indian J Dent Res*. 2010;21(3):463.
8. Baskar P. Tooth carving. *Indian J Dent Res*. 2009;20(1):130.
9. Rao A. Tooth carving. *Indian J Dent Res*. 2010;21(1):146.
10. Siéssere S, Vitti M, Sousa LGd, Semprini M, Regalo SCH. Educational material of dental anatomy applied to study the morphology of permanent teeth. *Braz Dent J*. 2004;15(3):238-47.
11. Buchaim RL, Andreo JC, Rodrigues AdC, Gonçalves JBdO, Daré LR, Rosa Junior GM, et al. Multidisciplinary approach in the teaching of dental sculpture and anatomy. *Int J Morphol*. 2014;32(2):399-403.
12. Juneja S, Juneja M. Role of computer-based learning in tooth carving in dentistry: An Indian perspective. *Int J Appl Basic Med Res*. 2016;6(3):164-5.
13. Nance ET, Lanning SK, Gunsolley JC. Dental anatomy carving computer-assisted instruction program: an assessment of student performance and perceptions. *J Dent Educ*. 2009;73(8):972-9.
14. Bogacki RE, Best A, Abbey LM. Equivalence study of a dental anatomy computer-assisted learning program. *J Dent Educ*. 2004;68(8):867-71.