



SCIREA Journal of Clinical Medicine

ISSN: 2706-8870

<http://www.scirea.org/journal/CM>

March 24, 2022

Volume 7, Issue 2, April 2022

<https://doi.org/10.54647/cm32764>

Educational Needs of Dental Laser as Perceived by Dental Graduates of Kashmir: A Survey of Knowledge and Skill Requirements

Sana Farooq ^{1,*}, Nazia Lone ², Mohsin Sidiq ³

¹ MDS Pedodontics and Preventive Dentistry , Registrar, Government Dental College and Hospital, Srinagar

² MDS Pedodontics and Preventive Dentistry , Professor and HOD , Department of Pedodontics and Preventive Dentistry Government Dental College and Hospital, Srinagar

³ MDS Pedodontics and Preventive Dentistry, Senior Lecturer, Government Dental College and Hospital, Srinagar

*Corresponding author : sanseafarooq5@gmail.com

Abstract :

Background : The use of laser is limited by the dental graduates because of lack of knowledge, effectiveness and due to high cost of laser unit. Lasers not only reduces the need for anaesthetics causing no pain in children during dental treatment but also are used for caries prevention, restorative removal and curing, cavity preparation, dentinal hypersensitivity, diagnostic purposes and soft tissue applications of incision, excision, ablation, wound healing, gingivectomy, frenectomy ,removal of hyperplastic tissue in impacted or partially erupted tooth, photodynamic therapy for malignancies, photo stimulation of herpetic lesion and even reduces gag. Though introduced in 1964, its knowledge and implementation has increased lately in our part of world.

Aim: This survey based study was conducted to evaluate the knowledge on laser and its implementation in the field of dentistry among dental graduates in Kashmir.

Methodology : This cross-sectional, descriptive study was carried out among 68 dental students of Government Dental College and Hospital, Srinagar, Kashmir through a questionnaire where knowledge, attitude and practice was assessed and data were entered and analysed statistically.

Results : 100% of the respondents wanted training on Lasers where 50% of the respondents desired dental education and workshops on Laser in future and only 21% of the respondents were satisfied with their knowledge on Lasers during undergraduate curriculum

Conclusion: More and more education should be given on laser to increase its implementation in field of dentistry.

Keywords : Laser dentistry, Dental education,

Introduction

LASER which stands for light amplification by stimulated emission of radiation was first developed by Theodore Maiman in 1960 though the stimulated emission theory was discussed later by Einstein in 1916.¹ The two types of lasers are : Hard lasers like Carbon dioxide (CO₂), Neodymium Yttrium Aluminum Garnet (Nd: YAG), and Er:YAG, which offer both hard tissue and soft tissue applications , is expensive and cause potential thermal injury to tooth pulp and Soft or Cold Lasers which is based on the semiconductor diode devices that are low-cost devices used predominantly for low-level laser therapy (LLLT) or ‘biostimulation’.²

The first laser was approved by Food and Drug Administration for intraoral use and initially it was first used for soft tissue incision but over the years due to their advancements and because of their special function on water molecules they could be used for ablation of dental hard tissue, caries prevention and diagnosis of dental caries with its treatment.^{3,4}

Presently the paradigm shift is occurring in field of dentistry because of advances in laser dentistry for which adequate training of clinicians is of utmost importance. Al-Jobair *et al.* in 2014 conducted a survey to assess the level of dental laser education among undergraduate students of Saudi Arabia. So seeing a tremendous increase in laser usage this survey was

carried out among dental graduate of Kashmir to assess their awareness, mindset, and knowledge regarding various applications of lasers and the information obtained from this survey will help in evaluating whether more stress needs to be given on training of the students in future in the undergraduate curriculum.

Materials and methodology:

After approval from the institution under order GDC/Pedo/2088, 68 copies of the questionnaire were whatsapped to the students during the month of February 2022 .The survey included interns and dental students of final year. The questionnaire comprised three parts: Part I (question 1, 2, 7,9) comprised of questions regarding knowledge ; Part II (question 3–4) question assessed the level practice of respondents regarding dental laser; and Part III (question 5) assessed the awareness and understanding of respondents regarding applications of lasers in different specialties of dentistry and Part IV (question 6 ,8 and 10) regarding need of education in future.The respondents were asked to respond to the primary investigator through the online link during the pandemic and data was collected and analysed

Table 1: Questionnaire for survey

1.Do you know the full form of LASER?	A Light amplification by stimulated emission of radiation	B Light application by stimulated emission of radiation	C. Light assimilation by stimulated emission of radiation.	
2.Do you have enough knowledge of LASER?	A Yes I have enough	B No	C I want dental laser education	
3.What kind of dental laser education do you think is needed?	A.Theoretical	B Practical	C Both	D No need
4. Do you think dental laser procedures should be inculcated in undergraduate course?	A Yes	B No		
5.In operative and endodontic dentistry and pediatric dentistry if laser is used what are the procedures?	A Restorative procedures ,pulp capping and reducing cavity preparation noise created by air rotor	B Can be used as a laser canal sterilization	C Can help in diagnosis of dental caries	D All of the above
6. Did you get any formal education related to dental laser ever in curriculum?	A More than 3 hours	B 1 to 3 hours	C 0 hours	
7.In aesthetic dentistry can	A Yes in laser bleaching and	B No in		

laser play a role?	crown lengthening	aesthetic dentistry laser has no role		
8. Have you been ever educated about laser safety protocol?	A Yes	B No		
9. Are you more aware about soft and hard tissue applications of laser?	A. Soft tissue application	B Hard tissue application	C Both	
10. Do you want a proper conference/workshop on laser dentistry to become mandatory in undergraduate curriculum?	A. Yes	B, No	C. May be	

Results:

Response rate: Sixty eight respondents agreed to participate in the study and completely filled questionnaire just skipping 8 questions . **Demographic profile of respondents:** The participants were in the age group of 21-24 years and were interns and final year dental students of Government Dental College and Hospital Srinagar.

Understanding and opinion regarding dental lasers: Only 3% of the respondents were not aware about the full form of LASER and 97% of the respondents correctly answered about LASER acronym full form (**Figure 1**) (**Table 1**) (**Table 2**).

1. Do you know the full form of LASER?

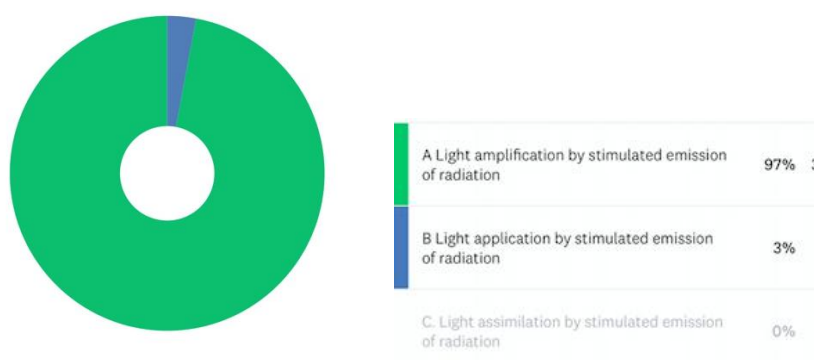


Figure 1:

50% of the respondents wanted dental education and workshops on Laser in future whereas only 21% of the respondents were satisfied with their knowledge on Lasers during undergraduate curriculum (**Figure 2**).

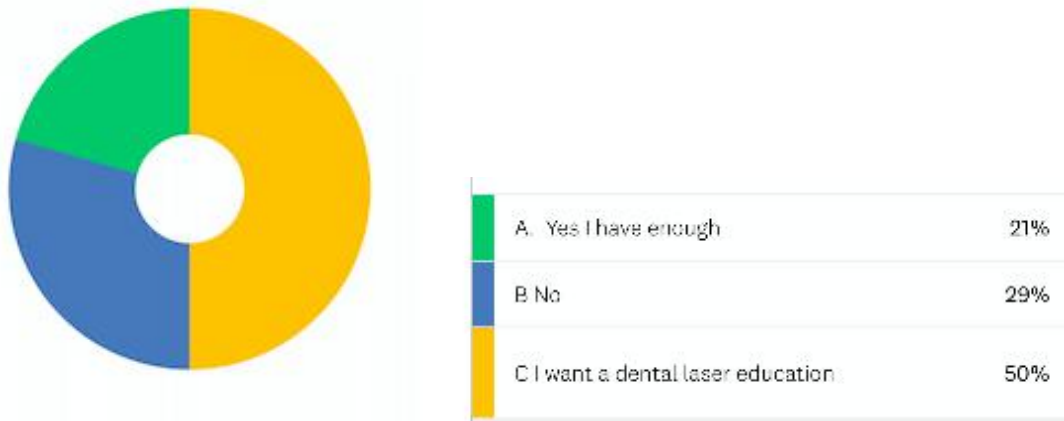


Figure 2

100% of the respondents wanted training on Lasers and 76% of the respondents believed that both theoretical and practical means should be employed simultaneously to educate and increases awareness about dental lasers (**Figure 3, q3**).



Figure 3

97% of the respondents wanted Dental laser procedures to be taught and educated in undergraduate course (**Figure 3, q4**)

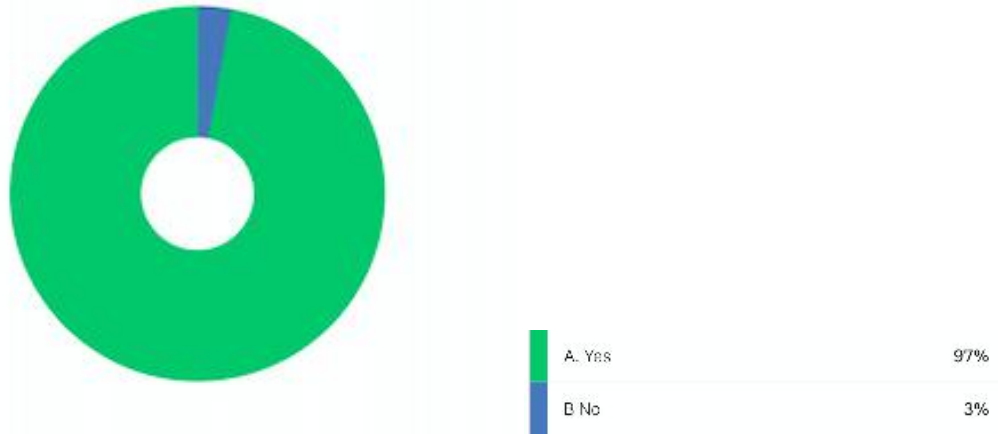


Figure 4

Knowledge regarding several application of lasers in various specialties of dentistry: 91 % of the respondents were well aware of all the applications of Lasers in operative and endodontic dentistry and pediatric dentistry like pulp capping and reducing cavity preparation noise created by air rotor, used as a laser canal sterilization and aid in diagnosis of dental caries (Figure 5, q5).

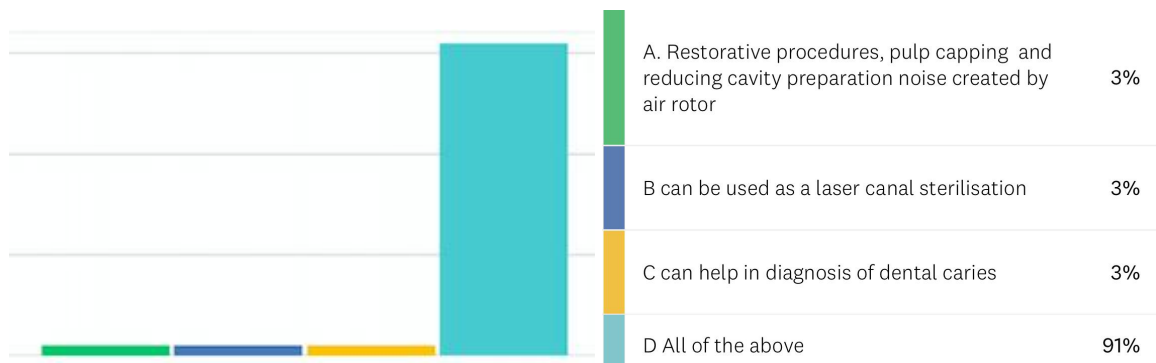


Figure 5

Training: Almost fifty percent of the respondents had not received any formal training regarding the use of lasers in their undergraduate curriculum whereas 44% had received 1-3 hour training (Figure 6).



Figure 6

97% of the respondents knew about the use of LASER in aesthetic dentistry for bleaching and crown lengthening (**Figure 7**).

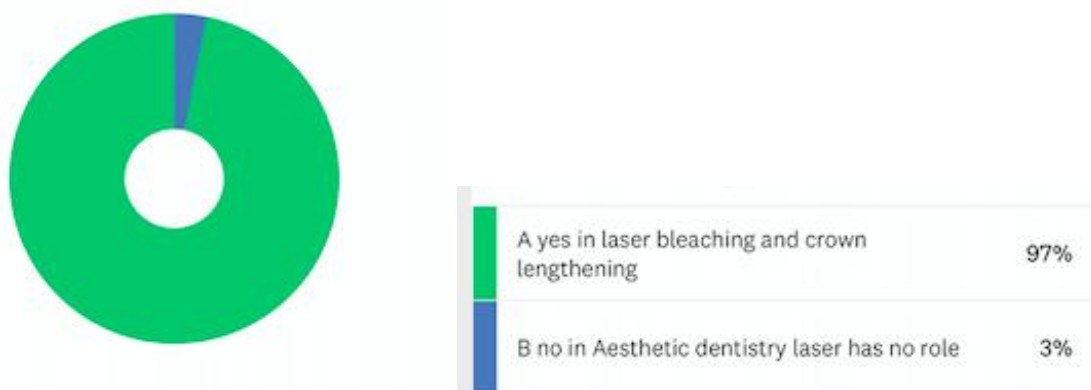


Figure 7

62% respondents said they were never educated about laser safety protocol (**Figure 8**)



Figure 8

53% of the respondents said they were more aware about both soft and hard tissue applications of laser.

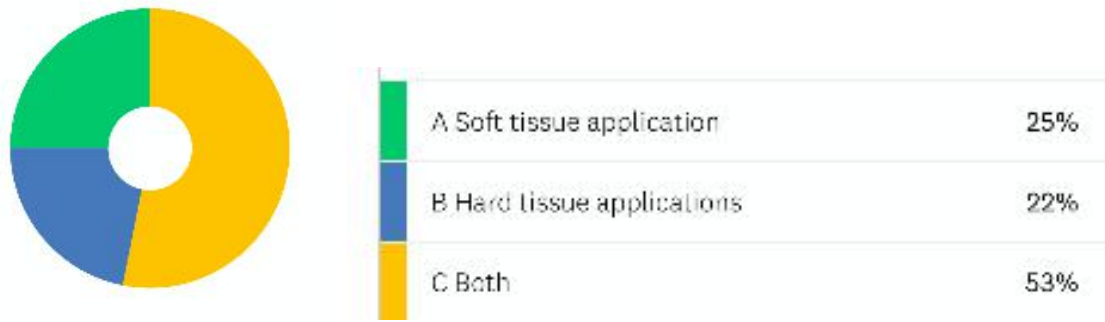


Figure 9

82% of the respondents wanted a proper conference/workshop on laser dentistry to become mandatory in undergraduate curriculum (Figure10,q10)



Figure 10

Table 2: Response table

Q. no	A %(n)	B %(n)	C%(n)	D%(n)	SKIPPED
1	97% (66)	3% (2)	0%		0
2	21% (14)	29% (20)	50% (34)		0
3	6%(4)	18% (12)	76% (52)	0%	0
4	97% (33)	3% (2)			0
5	3% (2)	3% (2)	3% (2)	91% (62)	0
6	6% (4)	44% (30)	50% (34)		0
7	97% (62)	3% (2)			4
8	38% (26)	62% (42)			0
9	25% (16)	22% (14)	53% (34)		4
10	82% (56)	3% (2)	15% (10)		0

Discussion

An online questionnaire-based survey was chosen for the study as it is cost-effective, reduces bias, can be easily used for large sample sizes and during COVID-19 pandemic reduces the cross contamination. Among the respondents, 82% of the respondents wanted a proper conference/workshop on laser dentistry to become mandatory in undergraduate curriculum as most of the students rely on information and training provided during their undergraduate courses, the introduction of laser courses in undergraduate curriculum might increase the popularity and application of this relatively new technology.

In our study 100% of the respondents of Kashmir knew about full form of LASER which was comparable to 93.6 % students as stated by Avhad R in 2019 at Mumbai.⁵ The findings were comparable to a study conducted by Bordea et al. which reported that 94.98% of the study participants knew what dental laser was.⁶

The most commonly used lasers are the diode lasers which are most often used among the practitioner because it is highly absorbed in pigmented tissues with minimal effect on the adjacent dental hard tissues. For preserving the vitality of pulp laser irradiation with different wavelengths of 0.5-1 W power with non-concentrated beam of low frequency and pulse mode without water for durations less than 10 seconds is useful and for children with traumatized central/lateral incisor using 808 nm probe prevents pulp necrosis and is useful in pediatric dentistry.⁷

Lasers are known to Control of Gag Reflex as its based on acupuncture on Nei Guan or P6 points which relieves symptoms such as nausea and vomiting and thus beneficial in placement of x-ray films, tongue retraction, impression taking, etc., especially in children. Its seen that Low level laser stimulation with 4J/cm, just before the procedure helps in alleviating anxiety, improves oxygen saturation as well as attenuating gag reflex in children.^{8,9}

A good number of respondents about 50% of them wanted dental education and workshops on Laser in future as implementation and integration of laser education with undergraduate course might help in increasing popularity and awareness about dental lasers whereas only 21% of the respondents were satisfied with their knowledge on Lasers due to undergraduate curriculum. The reason for lack of training or availability of lasers is due to high cost of the equipment. Most of the practitioners reported that they had not received proper laser education.

Lasers has role in caries prevention, pulpotomy, and pulpectomy in pedodontics as well as in root canal disinfection and regenerative endodontics. Al-Jobair *et al.* in 2014 conducted a survey to assess the level of dental laser education among undergraduate students of Saudi Arabia in 2014 whereas Verma SK conducted a survey in India to assess their awareness, mindset, and knowledge regarding various applications of lasers and stated only 21% of the respondents had received any formal training before the use of lasers..^{10,11}

Dentists should be aware of precautions to ensure safe and effective operation of laser by wearing protective eyewear by everyone in the vicinity of the laser, using warning signs posted outside like nominal hazard zone, limiting access to the surgical environment, minimizing the reflective surfaces and using high volume suction to evacuate any vapour plume created during tissue ablation and surprisingly 62% of the respondents in our study said they were never educated about laser safety protocol. So for the safety of the clinician and patients its mandatory to educate our future dental practitioners about laser safety measures.¹²

Conclusion :

Dental lasers were introduced to dentistry in the mid-1960s and respondents in my our study were interested in workshops .76% respondents stated that there is a need of proper training regarding both theoretical and practical aspects of lasers and theres a need of implementation of laser education in undergraduate curriculum which might provide a chance to dental graduates to gain knowledge and practice lasers at an early stage. So if this new technology is used to its full potential, it can revolutionize dentistry in various fields of diagnosis, aesthetics ,prevention, or treatment planning.

References :

- [1] Najeeb S, Khurshid Z, Zafar MS, Ajlal S. Applications of Light Amplification by Stimulated Emission of Radiation (Lasers) for Restorative Dentistry. *Med Princ Pract.* 2016;25(3):201-211.
- [2] Verma SK, Maheshwari S, Singh RK, Chaudhari PK. Laser in dentistry: An innovative tool in modern dental practice. *Natl J Maxillofac Surg.* 2012;3(2):124-132.
- [3] Boj J. The Future Of Laser Pediatric Dentistry. *J Oral Laser Appl.* 2005;5:173–7.
- [4] Nazemisalman B, Farsadeghi M, Sokhansanj M. Types of Lasers and Their Applications in Pediatric Dentistry. *J Lasers Med Sci.* 2015;6(3):96-101.

- [5] Avhad R, Jawade R, Sharma V, Shinde S, Nag A, Subramanian S. Evaluation of Dental students' Knowledge and Attitude regarding Laser Dentistry- An Original study. *J Adv Med Dent Scie Res* 2019;7(9):135- 138.
- [6] Bordea R, Lucaciu O, Campian RS. Student's knowledge and opinion regarding the need of implementation of Lasers in Dental Faculty curriculum. *HVM Bioflux* 2016;8:157-60.
- [7] Koci E, Almas A. Laser application in dentistry: an evidence-based clinical decision-making update. *Pak Oral Dent J.* 2009;29(2):409–423.
- [8] Elbay M, Tak Ö, Şermet Elbay Ü, Kaya C, Eryılmaz K. The use of low-level laser therapy for controlling the gag reflex in children during intraoral radiography. *Lasers Med Sci.* 2016 Feb;31(2):355-61.
- [9] Goel H, Mathur S, Sandhu M, Jhingan P, Sachdev V. Effect of Low-level LASER Therapy on P6 Acupoint to Control Gag Reflex in Children: A Clinical Trial. *J Acupunct Meridian Stud.* 2017 Oct;10(5):317-323.
- [10] Al-Jobair A. Dental laser education and knowledge among final year dental students at King Saud University in Riyadh, Saudi Arabia. *Saudi J Dent Res* 2014;5:98-10
- [11] Yadav S, Chaudhry S, Talwar S, Verma M. Knowledge and practices of dental lasers among dental professionals in India: A survey based study. *J Dent Lasers.* 2018; 12:50-5
- [12] Smalley PJ. Laser safety: Risks, hazards, and control measures. *Laser Ther.* 2011;20(2):95-106.