

# Use of Dental Lasers among Teaching Faculty of Private Dental Colleges in Chennai – A Questionnaire-Based Cross-Sectional Study

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## Abstract

**Background:** Lasers were developed with the hope of overcoming some of the drawbacks posed by conventional methods of dental procedures. **Aim:** The aim of this study was to assess the knowledge, attitude, and practices of lasers among teaching faculty of private dental colleges in Chennai. **Materials and Methods:** The cross-sectional survey was conducted among teaching faculty of several private dental colleges in Chennai. The self-administered validated questionnaire consisting of 15 questions regarding the dental lasers was designed and answered by 150 teaching faculty. Pearson Chi-square test was used for statistical analysis. **Results:** Overall, 126 (84%) responded that lasers should be the part of undergraduate curriculum and 131 (87.3%) felt that cost factor is the main reason for not using lasers in dentistry. **Conclusion:** Most of the dental faculty felt that they have sufficient knowledge about lasers and hands-on courses in continuous dental education (CDE) program will be the efficient method to gain knowledge about dental lasers.

**Keywords:** Dental lasers, private dental colleges, teaching faculty

## INTRODUCTION

Health-care professionals have the moral duty to treat patients in the safest manner to avoid the spread of many microorganisms such as viruses and bacteria.

One of the ways to minimize the spread of infections is the usage of lasers which is an instrument that creates light energy in a very narrow and focused beam. Light amplification by stimulated emission of radiation (laser) has been used widely in a range of medical and dental applications for the past 30 years and has recently risen the popularity.<sup>[1,2]</sup>

It is a minimally invasive alternative to certain invasive treatment options, such as treatment for tooth decay, gum disease treatment, treatment for hypersensitivity, and root canals.<sup>[3]</sup>

The benefits of lasers in dental practice are universally recognized and have been reported in the literature for many years.<sup>[4]</sup> The use and advantages of lasers should be emphasized and discussed in this particular moment because the adaptation

of the laser clinical protocols during this pandemic is essential to ensure the best prevention and safety for patients as well as practitioners.<sup>[5]</sup>

In hard tissue application, the laser is used for caries prevention, bleaching, restorative removal and curing, cavity preparation, dentinal hypersensitivity, growth modulation, and for diagnostic purposes, whereas soft-tissue application includes wound healing, removal of hyperplastic tissue to uncovering of impacted or partially erupted tooth, photodynamic therapy for malignancies, and photostimulation of herpetic lesion.<sup>[6]</sup>

Despite a tremendous increase in laser usage, very minimal survey has been conducted in India. Hence, this survey was carried out among the dental teaching faculty of private dental

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colleges in Chennai to assess their usage and knowledge regarding various applications of lasers.

### Aim

The aim of this study was to assess the educational level, usage, and knowledge of lasers in dentistry among teaching faculty of private dental colleges in Chennai.

### Objectives

The objectives of this study were to assess the:

- Overall knowledge on the uses of lasers in dentistry
- Knowledge on specific uses of lasers in different branches of dentistry
- Level of knowledge in laser protection
- Attitude and interest toward laser practice.

## MATERIALS AND METHODS

A cross-sectional descriptive study was carried among all the teaching faculties of private dental colleges in Chennai. Based on the stratified random sampling, four private colleges were considered and all the teaching faculty who met the inclusion criteria and given informed consent were considered for the study. Based on the previous study, with level of significance at 95%, power at 80% and effect size as 0.2 a total of 150 dental teaching faculty were included in the study. A self-administered questionnaire was used as the instrument for data collection. Before performing the actual study, pilot testing of the questionnaire was performed in a different institution to identify any potential discrepancies or ambiguities in the instrument. The questionnaire was validated by five experts in the field of dentistry, and subsequently, changes in the wording of some items were made to improve the structure and clarity of the questionnaire. Items in the questionnaire pertained to the demographic details such as age, sex, and years of experience and also knowledge, attitudes, and practices of health-care professionals with regard to dental lasers were recorded. Questionnaires were excluded from analysis if data were missing or responses were incomplete. The questionnaire-based survey was exempted from approval by the institutional ethics committee (MAHER). Informed consent was obtained from all the subjects. We did not record any personal identifiers or other confidential information. The questionnaires were given a unique code, and great care was taken during the distribution phase to ensure that duplication did not occur. The self-administered nature of the questionnaire ensured privacy and provided study subjects an opportunity to record their responses in a nonjudgmental manner. Data entry and statistical analysis were performed using Statistical Package for the Social Sciences (SPSS) 20 frequencies, and percentages were computed for categorical variables and mean and standard deviation were calculated for quantitative variables. Chi-square test was used to compare the level of education and knowledge and attitude among the teaching faculty of private dental colleges with Bonferroni posttest correction applied to reduce the instance of false positive.  $P < 0.05$  was considered statistically significant for all comparisons.

### Inclusion criteria

- All the dental teaching faculties who were willing to participate were included in the study, a pilot study was conducted among 15 participants, and the results of the pilot study were removed from the main study. Initially, 18 questions were formulated, and based on the results of the pilot study, three questions were removed due to the difficulty in answering the questions
- After extensive literature review of the dental laser types and common applications of laser in different dental specialties, twenty questions were self-administered and reviewed for content, clarity, bias, and the question adequacy to the study objective by a senior faculty
- The entered data were analyzed using SPSS 20 software (Chicago), and Chi-square test was used to analyze the data.

## RESULTS

Out of 150 teaching faculty, only 10 (6.6%) faculties had <10 years of experience and 60 (40%) of them had 1–5 years of experience, 61 (40.6%) of them had 5–10 years of experience, and 19 (12.2%) of them had more than 10 years of experience. The composition of study sample involves 78 (52%) females and 72 (48%) males, which is shown in Figure 1.

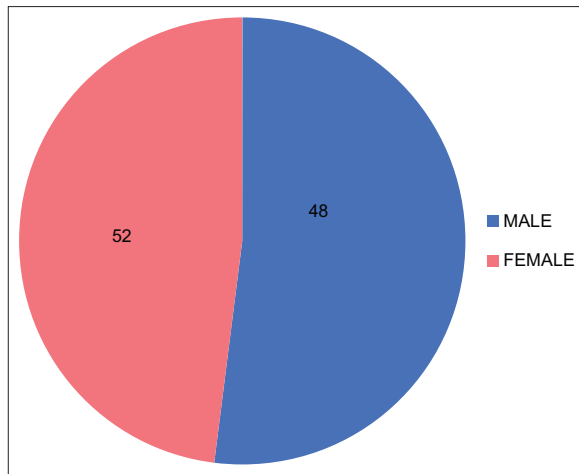
Most of them (147) heard about laser treatment in dentistry, and many of them (141) wish to learn more about laser usage in dentistry and also see laser being used in dentistry (130).

Out of 150 dental teaching faculties, 140 (93.3%) of them had mentioned the correct expansion for laser which is light amplification by stimulated emission of radiation. This shows the awareness of the study subjects toward lasers. Fifty-six (37.3) of them felt that they do not have sufficient knowledge toward dental lasers. One hundred and twenty-six (84%) of them felt that lasers should be the part of undergraduate curriculum which is shown in Figure 2.

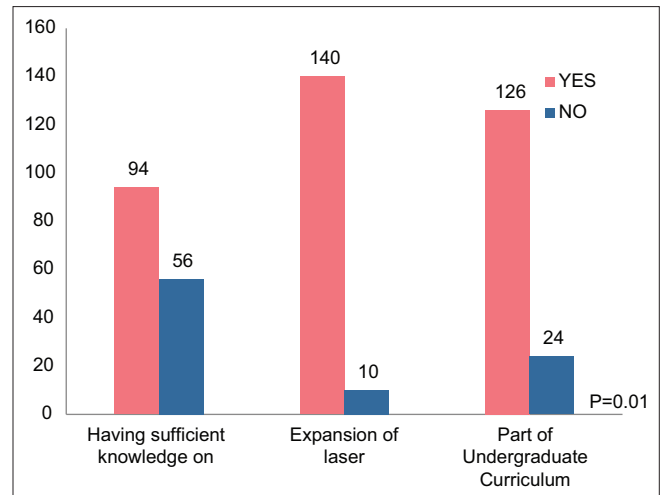
With regard to the usage of lasers in the field of dentistry, 137 faculties felt that lasers are most commonly used in endodontic and operative dentistry followed by oral surgery with least usage in oral medicine. None of them had mentioned about the laser usage in the field of oral pathology and public health dentistry which is not statistically significant and shown in Figure 3.

Regarding the uses of low-level lasers, 96% of the dental faculties felt that laser was used in fields of dentistry for reducing pain, 74% of them felt that it reduces edema and accelerates wound healing, and 68% of them felt that lasers will reduce herpes simplex blisters and 33% of them felt that it reduces sinusitis.

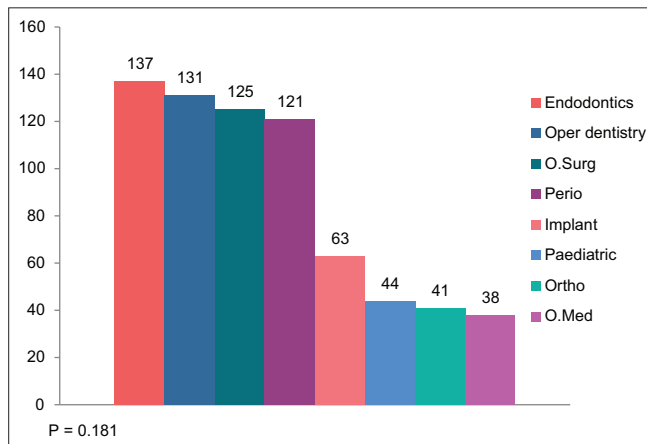
With regard to the sufficient method to gain knowledge about lasers among 150 dental faculties, 56 of them felt that hands on course in CDE program, 49 of them felt that course modulus



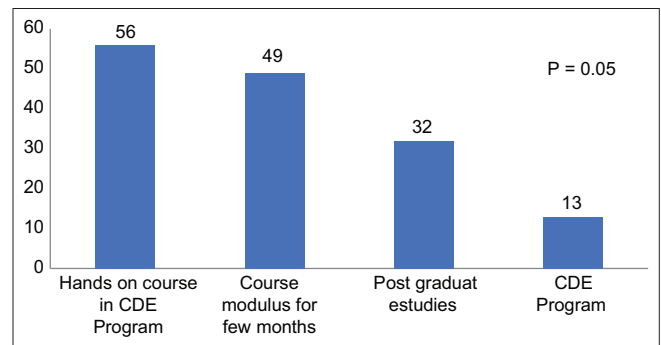
**Figure 1:** Composition of study sample based on gender in percentage



**Figure 2:** Response to various questions



**Figure 3:** Usage of lasers in the field of dentistry



**Figure 4:** Efficient method to gain knowledge about lasers

for few months, 32 dental faculty felt through postgraduate studies and 13 by CDE program which is depicted in Figure 4.

Many dental faculties felt that cost factor is the main drawback for usage of lasers, followed by insufficient knowledge, poor patient's acceptability, and poor results, which is shown in Figure 5.

With regard to the usage of low-level laser therapy, most of the dental faculties, i.e., 96 of them, felt that it reduces pain, followed by reducing edema and accelerated wound healing, herpes simplex blisters, and sinusitis. With regard to the popularity in the upcoming years, most of the dental faculty felt that lasers will be popular in soft-tissue procedure, followed by hard tissue procedure, which is depicted in Figure 6.

## DISCUSSION

The current study explored the knowledge, attitudes, and practices of dental faculties with regard to the use of dental lasers.

Almost 56 dental faculties accepted that they have insufficient knowledge on the usage of lasers which is similar to the study conducted by Sudha Yadav *et al.* among the dental professional

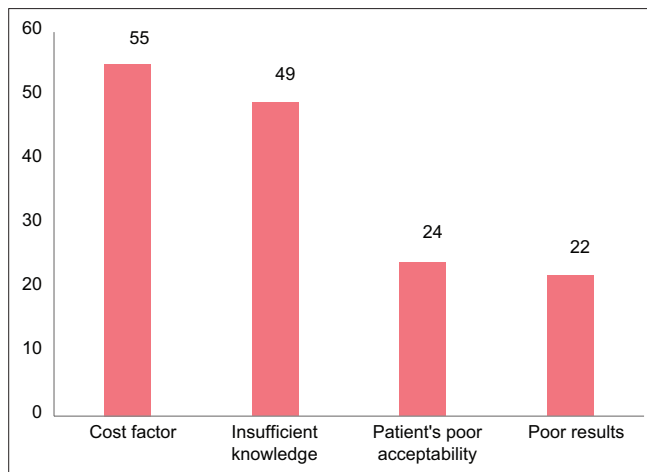
where they reported that many dental professionals had received only 1–8 h of laser education which is insufficient.<sup>[7]</sup>

In this study, many faculty had responded that dental lasers are used in various fields of dentistry with most of them responding endodontics and operative dentistry, oral surgery, and periodontics as the major field which is similar to the study conducted by Sudha Yadav *et al.* This shows that lasers are used mainly for the soft-tissue procedures as well as caries removal.

Although there are many advantages of lasers such as less pain and discomfort and faster healing time, there are few disadvantages such as need for general anesthesia, and in many cases, traditional therapy should be combined with lasers and small risk of injury to tooth and gingiva and the cost factor. In the present study, many faculties felt that the drawback of using laser is poor patient acceptance. This might be because of the cost factor of lasers which is more than the traditional method.

Majority of the faculty in the present study felt that the advantage of using low-level laser therapy is reducing pain whereas in a study conducted by Harini *et al.* among dentists in Tanjore responded less bleeding as the major advantage.<sup>[8]</sup>

In the present study, 126 dental faculties felt that laser should be the part of undergraduate curriculum which will improve the knowledge on dental lasers.



**Figure 5:** Drawbacks in using lasers

In a study conducted by Bagheri, 2015, at Ardabil city, 94% of the dentists have knowledge about use of laser in dentistry.<sup>[9]</sup>

In a study conducted by Tosun *et al.*, 2012, Turkey, dentists with higher levels of education tend to have more information about the usage of lasers in dentistry. In the present study, the results were not analyzed based on the experience and gender which is a major limitation of the study and also categorization in terms of experience is not equal and the study does not include the faculties from government dental college teaching faculty.<sup>[10]</sup>

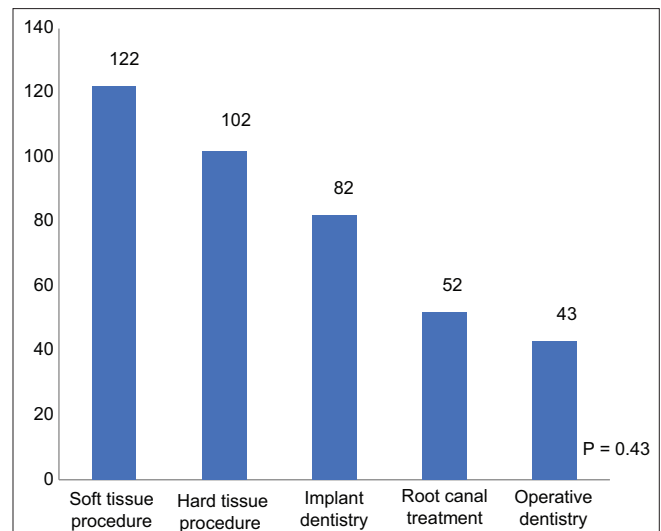
Hence, it is recommended to include the usage of dental laser to the curriculum with the use of correct wavelength, laser safety glasses, proper face masks, and face shields, and the use of high-speed evacuation equipment will modify traditional methods to new technologies.

## CONCLUSION

Most of the dental faculty felt that cost factor is the major drawback in using lasers followed by insufficient knowledge among them. Although dental lasers were introduced in the mid-1960s, lasers are not being used to their full potential. Results of this survey clearly indicate that dental practitioners need to attend hands-on courses on dental lasers to make them confident in using dental lasers. Lasers can also be included in UG and PG courses which can pave the way for more opportunities for the usage of dental lasers.

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This was a self-funding study.



**Figure 6:** Popular in upcoming years

## Conflicts of interest

There are no conflicts of interest.

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