“Laser Dentistry”—The Need of the Hour: A Cross-sectional Study

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Aim: The increase in the technological development in dentistry has led to a better and efficient treatment being rendered to the patient. One such development is the application of laser in the field of dentistry. The introduction of laser has provided various advantages to the dentist. Therefore, a study was conducted to assess awareness among the dentists in Coimbatore district about the application of laser.

Materials and Methods: A cross-sectional study was conducted among the dentists in Coimbatore district. A questionnaire consisting of three parts was used to assess the knowledge, attitude, and practice of laser dentistry. Results: The results were tabulated, and the percentages were statistically analyzed. The knowledge of laser usage and application of laser was present for almost 55% of the dentist. The attitude of dentist toward the advantage of laser was less. The practice of laser dentistry was poor among dentists, and only 10% were effectively practicing laser dentistry.

Conclusion: The advantages of laser in daily dental practice are more advantageous than the disadvantages such as cost of equipment and material handling. Therefore, there is a great need for creating awareness of laser dentistry. Cost-effective equipment is the need of the hour to promote laser dentistry.

Keywords: Dental application, laser dentistry, various specialties

INTRODUCTION

Constant endeavor in keeping up with latest technology to make their work faster, precise, and efficient, has led the field of dentistry to adopt many modern sophisticated techniques, and these have made dentistry gain tremendous popularity among urban and rural population alike. One such among many is the use of lasers in dentistry. Laser is an acronym for “Light Amplification by Stimulated Emission of Radiation.”[1,2] Along with many benefits, there are many challenges too faced by dentists such as high cost of laser unit and need for specialized training.[3,4] The aim of the study was to evaluate the knowledge, awareness, and practice of laser dentistry among general dentist in and around Coimbatore district. The technological development and need to inculcate newer techniques to treat patients were the leads of this study.[3-5]

MATERIALS AND METHODS

A cross-sectional questionnaire study was conducted among practicing dentists in and around Coimbatore district, Tamil Nadu. Sample size calculation was done using the following formula:

\[ \text{Sample size} = \frac{Z_{\alpha/2}^2 \times P(1-P)}{d^2} \]

Sample size derived was 240. Coimbatore district was divided into four zones as east, west, north, and south. Convenience sampling method was used to arrive at the adequate sample size.

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A total of 60 dentists were selected from each zone to eliminate selection bias.

**Data collection**
A self-administered closed-ended questionnaire was designed. The questions were divided into three sections based on knowledge, attitude, and practice. Each dentist was met in person and explained about the purpose of the study followed by procuring an informed consent. Questionnaires were collected from the dentists within 2 days after distribution. Of the 240 dentists surveyed, only 186 of them responded back with filled questionnaires. Fifty-four dentists did not respond back due to their busy schedules and inadequate knowledge about laser.

**Statistical analysis**
Data collected from the questionnaire were entered into Microsoft Excel. The Cronbach α statistical analysis was performed to check the reliability of the questionnaire. A questionnaire is considered reliable when the values obtained after performing Cronbach α statistical analysis are >0.7. The value obtained for the questionnaire used in this study was 0.834, which indicated its reliability.

**RESULTS**
This questionnaire was given to 240 general practicing dentists of different specialties in and around Coimbatore district. Only 75% (70% males and 30% females) dentists responded to the questionnaire. In accordance with age-group, 33% dentists were younger than 35 years, 52% dentists were in 32–55 years age-group, and 15% dentists were older than 55 years [Figure 1].

Table 1 shows that 55% of the dentists were aware about the use of lasers in soft tissue, 20% dentists were aware about its hard tissue application, and 20% dentists were aware about its application in both hard and soft tissues. Knowledge about dental laser application was obtained mainly in oral surgery (40%), periodontics (29%), endodontics (15%), pedodontics (6%), prosthodontics (6%), and orthodontics (4%). The most known laser types among them were diode (65%), carbon dioxide (20%), Er:YAG, Nd: YAG (10%), and argon (2%) lasers. Of the total dentists, 80% got training for practicing laser by attending continuing dental education (CDE) programs.

Table 2 shows dentist’s attitude toward laser application in dentistry. Most of the dentists were aware that laser will be less painful, requires less treatment time, does not require local anesthesia, and has faster healing. But 70% of the dentists were unaware that laser causes less bleeding during dental procedures.

Table 3 shows practice of laser among dentists. Though 70% of the dentists were interested in practicing laser, only 10% of the dentists were practicing laser dentistry using diode laser. High cost was the main reason for not practicing laser followed by the lack of experience, difficulty in convincing patients, and patient acceptance. Of the dentists, 95% showed interest to incorporate laser education in the under graduate (UG) curriculum.

**DISCUSSION**
The growing population and the advancements in technologies require regular upgradation of knowledge.

| Table 1: Knowledge |
|-------------------|
| **Questions**         | **Response (%)** |
| Laser is used in      |                  |
| Hard tissue           | 46 (25%)         |
| Soft tissue           | 102 (55%)        |
| Both                  | 38 (20%)         |
| Laser is most commonly used in which dental specialty? |  |
| Periodontology        | 54 (29%)         |
| Endodontics           | 28 (15%)         |
| Oral surgery          | 74 (40%)         |
| Pedodontics           | 12 (6%)          |
| Orthodontics          | 7 (4%)           |
| Prosthodontics        | 11 (6%)          |
| Which is the type of laser do you know? |  |
| CO₂                  | 38 (20%)         |
| Diode                | 120 (65%)        |
| Er:YAG               | 18 (10%)         |
| Nd:YAG               | 6 (3%)           |
| Argon                | 4 (2%)           |
| What kind of training did you undergo to practice laser? |  |
| Undergraduate/postgraduate | 8 (4%) |
| CDE                  | 148 (80%)        |
| Self-taught          | 30 (16%)         |
Laser dentistry is one such application and is the need of the hour. A survey was conducted to assess the knowledge regarding laser and its applications in dentistry. The majority of the dentists were aware of the application of lasers in dentistry; however, a majority of the dentists were of the opinion that lasers were used for only soft tissue procedures, but the diverse application of lasers in the various branches of dentistry is yet to be known to all general practitioners.[6] A vast number of practitioners were aware of the application of laser in the field of oral surgery and periodontics,[7-10] as their application for the soft tissue procedures was widely dependent on laser. The general practitioners were mostly dependent on the CDE programs or private learning sessions for their knowledge on lasers. The results of our study also showed the importance of educating dentists at their undergraduate level so that the application of lasers in general dental practice can improve.

The attitude of general dentists regarding the advantages of lasers was assessed and the following observations were made. Painless procedure is the most known advantage of laser among dentists as it may be due to general education knowledge about laser in dentistry.[11-14] Most of the dentists did not know about the homeostasis effect on dental tissues. The reduced duration of the dental procedure when done using laser was not known to most of the clinicians. The awareness of faster healing of tissues after laser procedure was also less among general dental practitioners.[15-17] The knowledge on the requirement for local anesthesia for procedures done using laser was also poor among dentists.

Though most of the dentists were interested in the usage of lasers, the inadequate experience and expensive equipment, investment in CDE, or private sessions to learn the technique hindered the application of laser in regular dental practice. With wide range of advantages of lasers, proper education and training at undergraduate level would drastically improve the knowledge and awareness of laser. Production of laser equipment in India with reduced cost would certainly reduce the treatment cost and increase the number of patients opting for laser dental procedures. This in turn will increase the number of dentists procuring laser equipment for their dental practice.

**Conclusion**

Dental lasers, being introduced since a decade, have not been used to its full potential. Knowledge and awareness of laser among dentists still remain questionable in spite of its advantages. The results of this study show that the majority of the dentists learnt about laser through CDE programs. This indicates that laser education needs to be implemented in UG program. Even though many dentists are interested in practicing laser, the major drawback lies in its cost factor. If it is used to its full power, laser can revolutionize dentistry in diagnosis, prevention, and treatment planning, thus providing utmost care to patients. In this technological era, an exponential usage in laser should be made possible by reducing its production costs with high standards.

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**Conflicts of interest**

There are no conflicts of interest.
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