

# Knowledge Attitude and Practice among Dental Practitioners Regarding Electrosurgery Using Lasers in Dentistry

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**Abstract:** Background: Electrosurgery is the application of a high-frequency (radio frequency) alternating polarity, electrical current to biological tissue as a means to cut, desiccate or fulgurate a tissue. Its benefits include the ability to make precise cuts with limited blood loss. Electrosurgical devices are frequently used during surgical operations helping to prevent blood loss in hospital operating rooms or in outpatient procedures. In electrosurgical procedures the tissue is heated by electric current. Aim: The aim of the study is to find the knowledge attitude and practice amongst dental practitioners regarding electrosurgery using lasers in dentistry. Objective: The objective of the study is to explore the use of lasers in electrosurgery in dentistry. Methodology: A cross sectional survey was carried among 100 dental practitioners in Chennai city. A self addressed questionnaire comprising of 15 questions eliciting information about the knowledge, attitude and practice among dental practitioners about laser electrosurgery were given to them. The responses obtained from the participants were processed further and analysed. Result and Conclusion: This survey inferred moderate levels of awareness about the usage of lasers for surgical purposes in dentistry (71%). However, all the participants expressed inadequacy about the various applications and handling of the laser (78%). Hence, vigorous awareness and training programs need to be initiated to address this concern.

## 1. Introduction

Introduction of laser in dentistry, in the 1960s, by Miaman, led to a continuous research in the various applications of lasers in dental practice. . We have gone from treating only soft tissue to treating hard tissues such as teeth and bone. The cost of soft-tissue lasers has decreased along with the size. General dentists can now easily integrate lasers into their practices. Laser procedures are usually divided into hard and soft tissue. Soft-tissue laser procedures are for periodontal treatment. Oral surgery, such as biopsies and frenectomies, can be accomplished with all soft-tissue lasers. Dentists need to become knowledgeable in the use of lasers so they can maximise the number of procedures that a laser can accomplish. A dental laser is a type of laser designed specifically for use in oral surgery or dentistry. In the United States, the use of lasers on the gums was first approved by the Food and Drug Administration in the early 1990s, and use on hard tissue like teeth or the bone of the mandible gained approval in 1996. Several variants of dental lasers are in use with different wavelengths and these mean they are better suited for different applications.

Lasers can be both soft tissue lasers as well as hard tissue lasers. Diode lasers, carbon dioxide lasers and Nd:YAG lasers are the soft tissue lasers.<sup>(1)</sup> Diode lasers wavelengths in the 810–1,100 nm range are poorly absorbed by the soft tissues such as the gingivae, and cannot be used for soft tissue cutting or ablation. Instead, the distal end of diode's glass fiber is charred (by burned ink or by burned corkwood, etc.) and the char is heated by the 810–1,100 nm laser beam, which in turn heats up the glass fiber tip. The soft tissue is cut, on contact, by the hot charred glass tip and not by the laser beam. Similarly Nd:YAG lasers are used for soft tissue surgeries in the oral cavity, such as gingivectomy, periodontal sulcular debridement, LANAP, frenectomy, biopsy, and coagulation of graft donor sites.<sup>(2)</sup> The Nd:YAG laser wavelength are partially absorbed by pigment in the

tissue such as haemoglobin and melanin. These lasers are often used for debridement and disinfection of periodontal pockets. Their coagulative ability to form fibrin allows them to seal treated pockets.<sup>(3)</sup> The CO<sub>2</sub> laser remains the best surgical laser for the soft tissue where both cutting and hemostasis is achieved photo-thermally. Er:YAG lasers, carbon dioxide lasers Er,Cr:YSGG Lasers are both soft and hard tissue compatible lasers. Erbium lasers are both hard and soft tissue capable. They can be used for a host of dental procedures, and allow for more procedures to be done without local anesthesia. Erbium lasers can be used for hard tissue procedures like bone cutting and create minimal thermal and mechanical trauma to adjacent tissues.<sup>(4)</sup> These procedures show an excellent healing response. Soft tissue applications with erbium lasers feature less hemostasis and coagulation abilities relative to the CO<sub>2</sub> lasers. The new CO<sub>2</sub> laser operating at 9,300 nm features strong absorption in both soft and hard tissue and is the newest alternative to erbium lasers.<sup>(5)</sup>

## 2. Materials and Methods

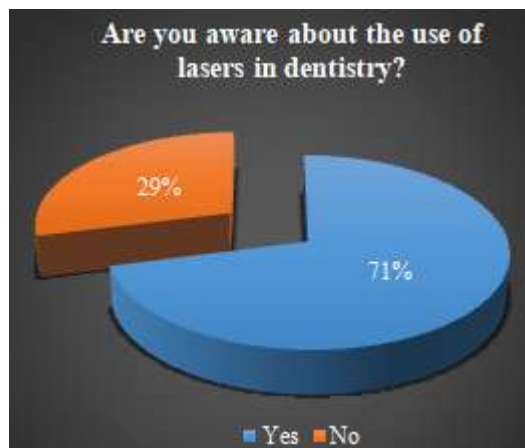
A cross sectional survey was carried among 100 dental practitioners in Chennai city. A self addressed questionnaire comprising of 15 questions eliciting information about the knowledge, attitude and practice among dental practitioners about laser electrosurgery were given to them. The responses obtained from the participants were processed further and analysed.

## 3. Results

The questionnaire is based on the knowledge, attitude and practice regarding the use of lasers in electrosurgery in dentistry among dental practitioners.

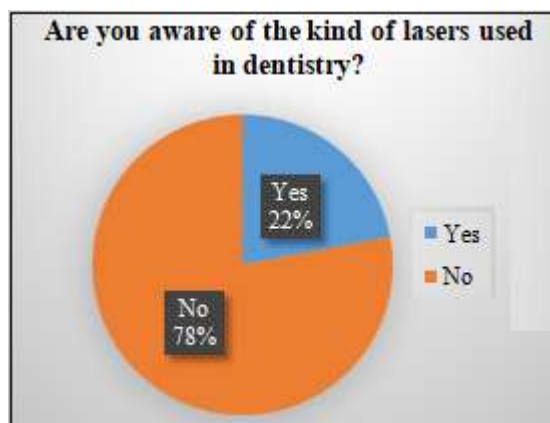
### Knowledge:

Of the 100 doctors included in the study, 71 percent are aware about the use of lasers in dentistry and 29 percent are not aware about the use of lasers in dentistry. fig(1) shows the knowledge about lasers in electrosurgery in dentistry.



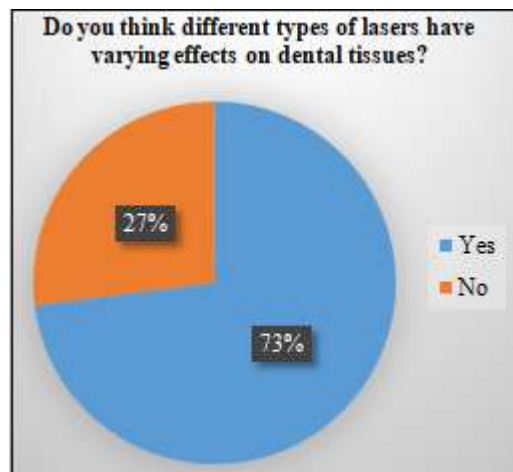
**Figure 1**

Of the 100 doctors chosen for the study, 78 were aware about the kinds of lasers used in dentistry and 22 did not know about the different kinds of lasers used in dentistry. This is shown in figure (2).



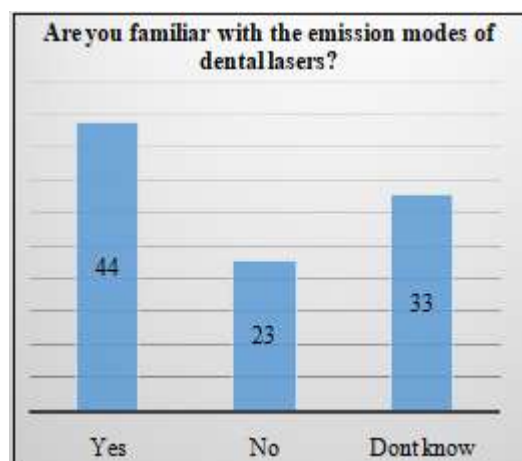
**Figure 2**

Of the 100 doctors chosen for the study, 73 percent said different type of lasers have varying effects on dental tissues and 27 percent said that different types of lasers didn't have varying effects on dental soft and hard tissues. This is shown in figure(3)



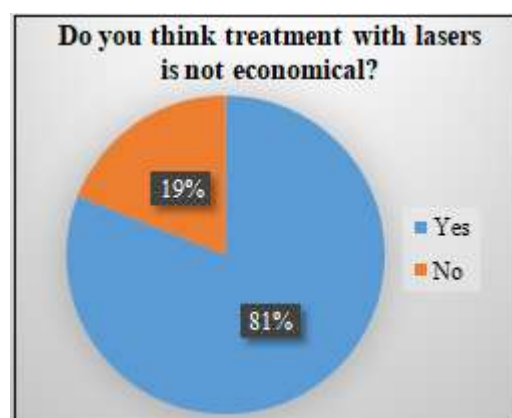
**Figure 3**

Of the 100 people chosen for the study, 44 percent were aware about the emission modes of dental lasers, 23 percent were not aware and 33 percent didn't know about the emission modes of dental lasers. This is shown in figure(4)



**Figure 4**

Of the 100 doctors, 81 percent said that treatment with lasers was not economical while 19 percent said that treatment with lasers was economical. This is shown in figure(5)



**Figure 5**

Of the 100 people chosen for the study, 66 percent felt that they were properly trained to handle lasers while 34 percent felt they weren't properly trained to handle lasers. This is shown in figure(6).



Figure 6

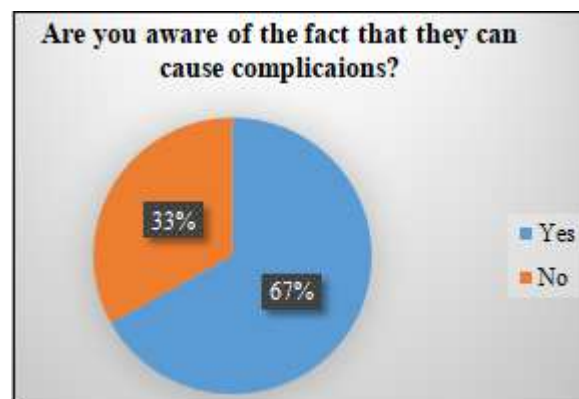


Figure 9

Out of the 100 doctors chosen for the study, 22 percent said that ER,CR:YSGG lasers can be widely used on all tissue types, 29 percent said that ND:YAG lasers can be used on all tissue types, 9 percent said other laser types can be used on all tissue types and 40 percent did not know about the types of lasers that could be used on all of the tissue types. This is shown in figure-7.

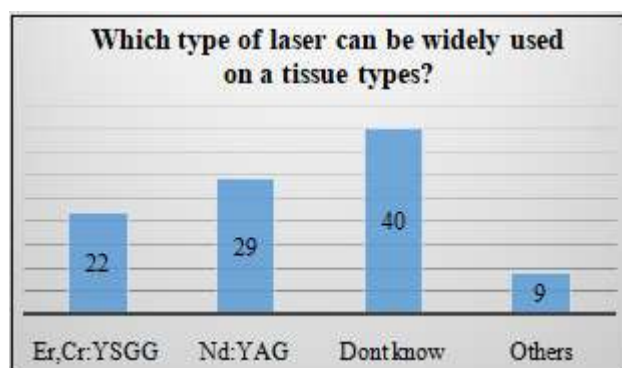


Figure 7

Out of the 100 doctors chosen for the study, 92 percent felt that lasers were more beneficial when compared to other treatment options and 8 percent felt that use of lasers was not beneficial when compared to other treatment options. This is shown in figure-8.

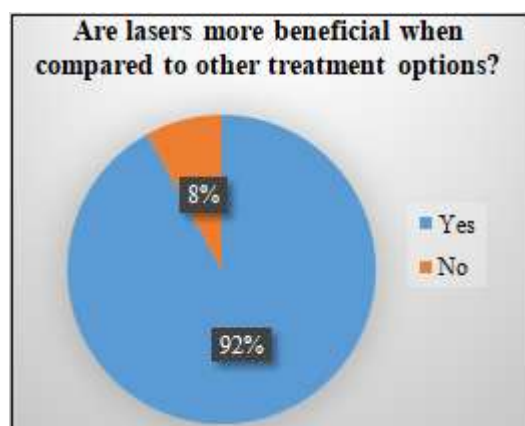


Figure 8

Out of the 100 doctors chosen for the study, 67 percent said that they were aware about the fact that lasers can cause complications whereas 33 percent were unaware about the fact that lasers can cause complications to dental hard and soft tissues. This is shown in figure 9.

#### 4. Discussion

In the current study, Of the 100 doctors in India chosen for the study over 70 percentage of the doctors in India are aware about the usage of lasers in electrosurgery in dentistry but their knowledge about the usage, composition, types of lasers and their advantages and disadvantages are limited, 78 percent of the doctors are not aware of the types of dental lasers and the awareness rate is only at 22 percent. Of the 100 people chosen for the study, 44 percent were aware about the emission modes of dental lasers, 23 percent were not aware and 33 percent didn't know about the emission modes of dental lasers. Out of the 100 doctors chosen for the study, 92 percent felt that lasers were more beneficial when compared to other treatment options and 8 percent felt that use of lasers was not beneficial when compared to other treatment options, 67 percent said that they were aware about the fact that lasers can cause complications whereas 33 percent were unaware about the fact that lasers can cause complications to dental hard and soft tissues, 22 percent said that ER,CR:YSGG lasers can be widely used on all tissue types, 29 percent said that ND:YAG lasers can be used on all tissue types 9 percent said other laser types can be used on all tissue types and 40 percent did not know about the types of lasers that could be used on all of the tissue types, 78 were aware about the kinds of lasers used in dentistry and 22 did not know about the different kinds of lasers used in dentistry. Another factor inhibiting the growth of laser applications in dentistry is inadequate training of dental professionals regarding the use of lasers. Of the 100 doctors chosen for the study, 66 percent felt that they were not properly trained to handle lasers while only 34 percent felt that they were properly trained to handle lasers. The status of lasers in both hard and soft tissue surgeries has become an important part of dental practice. They have made treatments a lot easier and more convenient for the patient but have their share of disadvantages too. Lasers can have a number of side effects even if handled by the most experienced of persons.<sup>(6)</sup> Although dental lasers have been used extensively in treating dental problems, no lasers have received the American Dental Association's seal of acceptance as an alternative to other traditional treatments. That seal assures dentists that the product or device meets ADA standards of safety and efficacy, among other things. The ADA, however, states that it is cautiously optimistic about the role of laser technology in the field of dentistry. These lasers are different from the cold lasers used in phototherapy for headaches, pain

and inflammation.<sup>(7)</sup> All lasers work by delivering energy in the form of light. When used for surgical and dental procedures, the laser acts as a cutting instrument or a vaporizer of tissue that it comes in contact with. When used for "curing" a filling, the laser helps to strengthen the bond between the filling and the tooth. When used in teeth-whitening procedures, the laser acts as a heat source and enhances the effect of tooth-bleaching agents. Lasers do possess several advantages when compared to the conventional dental drill some of them being, they may cause less pain in some instances, so reduces the need for anaesthesia. They May reduce stress in patients uncomfortable with the use of the dental drill. Minimize bleeding and swelling during soft tissue treatments, May preserve more healthy tooth during cavity removal.<sup>(8)</sup> The disadvantages of lasers can be the following. Lasers can't be used on teeth with fillings already in place. Lasers can't be used in many commonly performed dental procedures. For example, lasers can't be used to fill cavities located between teeth, around old fillings, and large cavities that need to be prepared for a crown. In addition, lasers cannot be used to remove defective crowns or silver fillings, or prepare teeth for bridges. Traditional drills may still be needed to shape the filling, adjust the bite, and polish the filling even when a laser is used. Lasers do not eliminate the need for anaesthesia.<sup>(9)</sup>

## 5. Conclusion

With science and technology almost dominating every field, dentistry is no spare. The awareness of electrosurgery in dentistry in our study, the awareness being on an average note several steps has to be taken in order to address this issue.. Introduction of short term courses after the UG or Pg level can pave way for more opportunities for the usage of lasers in India.<sup>(10)</sup> Short and long term research projects which offer a hands on experience, conferences on laser electrosurgeries and awareness programs can be conducted to make dental practitioners more aware and confident about the usage of lasers.<sup>(11)</sup>

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