

Perception of the professors of a Dentistry course about low intensity laser therapy

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ABSTRACT

The trend in dentistry is to incorporate less invasive methods. Therefore, we believe that low intensity laser therapy (LILT) can be a treatment option, as it has proven beneficial effects. The present study aims to trace the teaching pattern and teachers' perception of the use of low intensity laser therapy in the Dentistry undergraduate course at the Federal University of Espírito Santo. In addition, we intend to analyze the presence of laser therapy subject in Brazilian dental programs. The research was based on an analytical, cross-sectional, and descriptive study. A questionnaire was applied to 44 professors of dentistry at the Federal University of Espírito Santo. From this study, it was obtained that 9% of all the teaching staff stated that they use lasers in some of the activities of the subjects they teach. This low percentage was justified by the teachers due to the lack of financial resources to obtain the equipment. It was observed that most of the teaching staff have already known about the laser, 45.4% during their graduate studies. When the curricular structure of the 461 Brazilian higher education institutions of dentistry was evaluated, it is noted that 13 offer laser therapy in their curricular program. It can be concluded that there is a considerable level of knowledge about lasers among the teaching staff. However, it is observed a lack of dissemination of information among the different disciplines of the analyzed course.

Descriptors: Laser Therapy. Dentistry Education. Curriculum.

1 INTRODUCTION

The word laser is an acronym for “light amplification by stimulated emission of radiation” and is a type of electromagnetic radiation that is transformed into light energy¹. This monochromatic energy, with highly focused coherence, is capable of stimulating photoreceptors at the cellular level, which are able to absorb photons of certain wavelengths. That transforms the functional and metabolic activity² in the cells. Low-power laser therapy (LPLT) is based on the use of light irradiances capable of influencing cell behavior. In this way, the emitted irradiation is not thermal. That means its biological effects are caused by photophysical, photochemical and photobiological effects in the cells of the irradiated tissues³.

According to the power of emission, laser radiation is classified into high, medium and low intensity. As for clinical utility, lasers can be classified into two major groups: high-power or surgical lasers and low-power or therapeutic lasers. The first one presents: thermal effects, cutting properties, vaporization and hemostasis. The second presents: biostimulation, analgesic, anti-inflammatory and acceleration of wound healing properties, which can provide a more comfortable post-surgery period for the patient, with reduced use of medication⁴⁻⁶. The low power laser does not have a directly curative effect. However, these properties provide an attenuation on the patient's clinical condition during the post-surgery period, reducing interstitial edema and decreasing pain symptoms. Histopathological analyses of irradiated tissues commonly show signs of tissue repair of the injured region through the process of cell biostimulation⁷.

The indications for the use of laser are very useful in clinical dentistry. They can be dental hypersensitivity, paresthesia, wound healing,

temporomandibular disorder rehabilitation, and oral surgery, among others⁸. The main biomodulatory effects of the low-intensity laser are related to analgesia, inflammation modulation and tissue repair. Clinically, LPLT is used to treat oral mucositis, recurrent thrush, lesion of traumatic origin, herpes simplex and other viral stomatitis³.

The use of lasers is considered one of the greatest technological advances in medicine and dentistry. It is being used in a wide range of areas, from diagnostics to therapy. The clinical efficiency of the laser progressively achieves clinical relevance related to the stimulation of tissue repair. It is due to its remarkable ability to stimulate and accelerate the healing of tissues, such as skin, ligament, tendon, bone, and cartilage⁹.

The increased interest in LILT has been noted in scientific circles due to the significant number of satisfactory treatment results. However, the establishment of the laser as a therapy requires knowledge of the energy applied, an investigation of the effects it produces in the body, and the application of a correct protocol¹⁰. The safe use of this resource by the dental surgeon is conditioned on previous training, based on the theoretical basis necessary to understand this science¹¹.

According to the National Curriculum Guidelines¹², the undergraduate course in Dentistry aims to train health professionals who are able to develop actions for prevention, promotion, protection, and rehabilitation of individual and collective health. Each professional must ensure that his or her practice is carried out in an integrated and continuous way with the other instances of the health system, being able to think critically, analyze society's problems, and seek solutions to them. Professionals must perform their services within the highest standards of quality and the principles

of ethics/bioethics, keeping in mind that the responsibility of healthcare does not end with the technical act. It just ends with the resolution of the health problem, both at the individual and collective level. For these conditions to be attended and for the curricular development to take place, it is necessary to be aware that, besides the pedagogical project of a course, it is necessary to count on the concrete action of its teachers¹³.

In September 2008, the Federal Council of Dentistry (CFO)¹⁴ recognized and regulated the use by the dental surgeon of integrative and complementary practices in oral health. Among these practices are Acupuncture, herbal medicine, flower therapy, hypnosis, homeopathy, and laser therapy. Since the insertion of laser therapy into the daily practice of the dental surgeon, it is necessary to add this topic to the curricular structures of undergraduate dental courses, in order to expand the student's vision and provide new treatment methods.

Therefore, this research aims to show the teaching pattern and the perception of the teachers about the use of low intensity laser therapy in the Dentistry undergraduate courses of the Federal University of Espírito Santo. In order to understand this panorama, the study also seeks to analyze the presence of laser therapy subjects in the curriculum of dental schools in Brazil. That aims to identify the needs for a better dissemination of this science and to update the academic curriculum, according to the proven benefits of its applicability in clinical dentistry.

2 METHODS

The research was developed from an analytical, cross-sectional and descriptive study. The scenario of the study was the Dentistry course at the Federal University of Espírito Santo and the clinical disciplines belong to the professionalizing cycle. For the study

population, composed of 56 teachers, anonymous and confidential questionnaires were handed out, so that no teacher was identified. These questionnaires aimed to collect personal, general and specific information about the clinical aspects and laser use by the participants. In addition to the questionnaires, the respondent signed a Consent Form provided and read during the research.

The questionnaire used was composed of objective questions about laser knowledge and its applicability, in order to evaluate the perception of the research participants about laser therapy in dentistry. The questionnaire was divided into three blocks, each block with an average of four to five questions.

Block number 1 corresponded to the identification phase of the participating teacher, and was composed of four questions. The first question refers to the age of the teacher. Next, they were asked about how long they have been working in dentistry, how long they have been teaching, and, finally, in which area they work (if in another area/specialty).

Blocks 2 and 3 were questions about attitudes and knowledge laser related. Block 2 consisted of four questions, and Block 3 consisted of five questions. During the second stage of the questionnaire, the professors answered questions about whether they had a private laser equipment; if they used lasers in the subjects they taught in the Dentistry course of the Federal University of Espírito Santo; whether they were useful in their area of work; and if they had ever requested a laser equipment from the Dentistry course administration or their department. In the third block, the teachers answered questions related to their interest in updating themselves about laser therapy through periodicals, books, or courses. They also answered whether they had knowledge of laser therapy during their undergraduate or graduate

studies.

The questionnaire was administered by a trained academic researcher with a theoretical background on the topics of lasers in dentistry. The data were analyzed using descriptive statistical analysis in percentages.

After data collection, the website of the Ministry of Education and Culture (e-MEC)¹⁵ was accessed to compile the web addresses of the Dentistry courses, which were analyzed in order to detect the standard of education on laser therapy. Later, a comparative analysis was performed between the information obtained from the Brazilian courses and the Federal University of Espírito Santo.

This study is in line with the national legislation regarding the ethical principles involving the use of data provided by human beings and was submitted to and approved by the Research Ethics Committee (CAAE: 31320220.5.0000.5071).

3 RESULTS

A total of 56 professors teach the Dentistry course at the Federal University of Espírito Santo. Among them, 44 answered the questionnaire, which represents 78.5% of the course teaching staff, and 2.2% (1) refused to participate in the research. The other teachers did not return the questionnaire. Among the 56 faculty members, 48.2% (27) work in the Department of Clinical Dentistry (DCO), 41.1% (23) in the Department of Dental Prosthesis (DPD), and 10.7% (6) in the Department of Social Medicine (DMS).

After the questionnaires were returned to the teachers in the three departments, the data were compiled to obtain the final result.

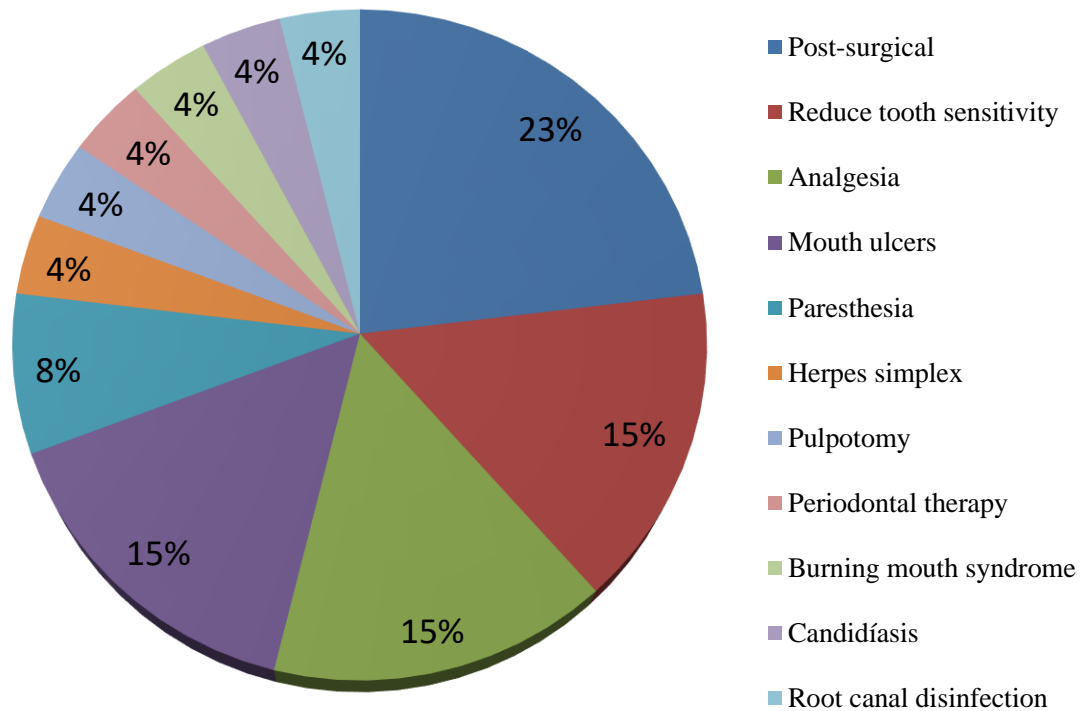
The age of the teachers ranged from 32 to 67 years, and 45 years was the average age. Regarding the average time they have been teaching the Dentistry course, it was 16 years.

When asked if they work in more than one specialty, 22.7% (10) answered yes, and 77.3% (34) said they did not.

Considering the subject they teach, 29 teachers work in the clinics, 4 work in laboratories, and 11 teach in both laboratories and clinics, most of them with an average of 30 students per semester. When asked how many have the laser equipment privately, only 13.6% said they have the equipment, with 9% (4) belonging to the DCO, 4.6% (2) to the DPD, and none of the DMS professors have the laser.

When asked if they have the equipment to use in the discipline they teach and if they have ever requested it from the institution, only 9% of all faculty members said yes. That corresponds to a total of 4 professors, all of them belonging to the Department of Dental Clinic. They teach the disciplines of Radiology, Stomatology, Interdisciplinary Clinical Internship 1, and Oral and Maxillofacial Surgery 2.

When the teachers were asked about the reason for not having the laser equipment to use in the discipline they teach, the predominant answer was the lack of financial resources from the institution. Another aspect addressed by the questionnaire referred to the introduction of laser knowledge to these teachers: 15.9% answered that this knowledge was introduced during their undergraduate studies, and 45.4% during their graduate studies. When questioned about having realized a laser course, 43.1% said they had, and 72.7% were interested in realizing a course in this area. Of the participating teachers, 79.5% said they had access to laser literature. Among them, 24 were updated through periodicals, 3 through books, and 8 through both periodicals and books. When asked about the indications for the low-intensity laser, the most common answers were post-surgical indication, reduction of dental sensitivity, and analgesic action (graph 1).



Graph 1. Teachers' responses to laser indications

In the search carried out on the e-MEC website, it was possible to observe that there were 461 active dentistry courses at the time of data collection. Among them, 168 were located in the Southeast Region, 131 in the Northeast Region, 79 in the South Region, 42 in the North Region, and 41 in the Midwest Region. Among all the existing courses, 13 (0.02%) offer laser therapy in their curriculum. They are located in the following geographic regions: Southeast 5, Northeast 3, South 2, North 2, and Center-West 1. Regarding the presentation of the laser discipline, it was observed that 61.5% are presented as optional, 23.1% as elective, and 15.4% as a compulsory subject.

The University of São Paulo (USP) and São Leopoldo Mandic, in Campinas, are the two institutions in São Paulo that offer the laser discipline, both as optional subjects. In Minas

Gerais, the Faculty of Administrative Studies (FEAD) offers the subject as a compulsory subject, and the Faculty of Sete Lagoas (FACSETE) offers it on an optional basis. In the state of Rio de Janeiro, only the University of Federal Fluminense (UFF) has this discipline, being offered as an optional subject. In Espírito Santo, no institution provides access to laser therapy in the curriculum. The Federal University of Bahia (UFBA) and the Florence Institute, in Maranhão, offer laser as an option in the curriculum of Northeast Region institutions. The University Center Unifacisa, in Paraíba, is an elective one.

In the Southern Region, the University of Extremo Sul Catarinense (Unesc) and the Integrated Regional University of the Alto Uruguai e das Missões (URI) are worth mentioning. The first institution offers laser

therapy as an option and the second as a compulsory subject. In the North Region, we can mention the Presidente Antônio Carlos Faculty (FAPAC) and Science Faculty do Tocantins (FACIT), both as an elective subject. Finally, the Institute of Higher Education of Brasilia (IESB) provides, for the tenth period students, the laser teaching in association with technological innovations in Dentistry as an elective subject.

4 DISCUSSION

According to Fernandes Neto et al. (2017)⁸, the use of laser has been widely studied and indicated in dental practice since the technique has numerous advantages and benefits. It can be used alone or as an adjunct to other traditional treatments, but it should always be performed safely by qualified and skilled professionals.

In accordance with Zerbinati et al. (2014)¹, the laser has been widely disseminated, but not always correctly used. That is due to the still deficient basic knowledge of laser operation by professionals, especially those who have not been specifically trained in this area.

In this study, it was observed that the laser is rarely used in the Dentistry course of the Federal University of Espírito Santo, considering that only 9% of the professors use it in the subjects they teach. Part of this result can be attributed to the laser low indication for some subjects, for example: those related to the Department of Social Medicine, such as Health, Society and Culture, Collective Oral Health I and II, Ethics and Bioethics. In all of them, the teachers answered that the laser is not indicated. Thus, this fact contributes to the low index obtained in the research. As a consequence, it is observed that there is a weakness in the course analyzed, because the scientific literature widely informs the benefits and applications of the laser therapy.

Through the research, it was possible to

diagnose some problems that were not known before, such as the low indication of the laser and little request for the equipment, with 84.6% of the DCO, 100% of the DPD, and 100% of the DMS never requesting it. The difference between the DCO and DMS can be explained by the fact that the procedures performed in the first department justify the application of the laser, such as endodontic, periodontal, stomatological, and surgical treatments. At the same time, the DMS performs procedures in which the laser is dispensed, such as plaque revealing, oral hygiene instruction, topical fluoride application, and intra and extramural educational activities.

It was observed that the professors of this dental course believe that they have considerable knowledge regarding laser therapy subjects, including the indications and the use of the equipment. However, a modest demand for the acquisition of the equipment was noted, as 91% of the teachers did not make such a request. This low rate of request was justified due to the low financial resources available for the acquisition of new equipment. It was not clear whether they requested and were refused or simply not requested. Similarly, Zerbinati et al. (2014)¹ evaluated 25 faculty members of the Dentistry course at the Bahiana School of Medicine and Public Health (Salvador- BA) about their knowledge of the laser. They found that this institution did not offer the discipline of laser and noticed that only 1% and 36% of the teachers said they had information about laser when they were undergraduate and graduate students, respectively. By contrast, the percentages obtained in the present study were 15.9 and 45.4%. Regarding the realization of the laser course, 16% of the teachers analyzed by the author mentioned above did so. In contrast, 43.1% of the teachers in the sample of the present study carried out a laser course.

It is important to note that the research

conducted by Zerbinati et al. (2014)¹ evaluated the knowledge of the teachers interviewed, while the present study evaluated the perception of these teachers regarding what they believe about their knowledge on the subject.

A total 78.5% of the teaching staff of the Federal University of Espírito Santo participated in the research. That reinforces the reflections of Ribeiro (1999)¹⁶(1999) 16 who says that the teacher is currently a teaching guide in the search for information and learning, besides he also is a stimulator of the student's critical capacity. According to Foresti (2001)¹³, it is necessary to think about teaching within a paradigmatic transition framework, in the sense of structural changes in practice that break the logic of reproduction and memorization, of fragmented knowledge, of the separation between theory and practice. It is important to build a methodology that considers the relationships between science and the construction of knowledge between teaching and research, between content and form, between theory and practice, and between the pedagogical, epistemological, and political dimensions of teaching practice in universities.

According to the data collected by MEC's electronic address, it was found that a total of 13 Brazilian Dentistry courses offer laser therapy in their curriculum. The offer is justified by the scientific, theoretical, and practical knowledge it can provide to the students. Among these benefits, excerpts from some of the courses descriptions analyzed are transcribed below: understanding of the interaction and effects of the laser with tissues of the oral cavity; use of laser and other photo therapies in health; physical principles applied to laser therapy; antimicrobial photodynamic therapy; safety standards; clinical applications; understanding and application of low power laser in the care of mucositis resulting from chemotherapy and/or radiotherapy treatment.

In 2013, Gomes et al.¹¹ conducted a research on the CFO website, identifying 174 Higher Education Institutions (HEIs) that had undergraduate dental degrees and offered the laser subject in their curriculum. In the sample analyzed, 22 (12.6%) offered laser subject in dentistry. Among them, 9.4% were public and 14% were private($p = 0.399$). Thus, we can see that there has been a vertiginous growth in the number of dental courses from the 2013 study to the present. We can also observe that the insertion of laser subject in the curriculum has not kept up this growth, as the rate went from 12.6% to 0.02%. The factors for this panorama can be diverse, from the lack of resources for the acquisition of the equipment to the need for trained teachers. It can also be due to the detriment of the laser content to benefit other subjects, which have more comprehensive relevance such as Hospital Dentistry, PNEs, among others. It can yet be because of the increased course load in topics such as public health, health system, and interdisciplinary content.

The search in the scientific literature in order to identify the approach of the insertion of laser subject in dental education ("Low-Level Light Therapy"[Mesh]) AND "Education, Dental, Graduate"[Mesh]) shows a lack of discussion on the subject compared to the quantity of relevant studies presenting the great applicability of the laser in the different specialties of dentistry and in other areas of health.

Considering the scientific evidence that points to benefits in the use of laser therapy and the real need to build knowledge about this therapy for a larger number of students, the need to adopt laser therapy as part of the curriculum of the Federal University of Espírito Santo becomes clear. This idea corroborates with the initiative of Zerbinati et al. (2014)¹, who believes it is

necessary to improve the dissemination of knowledge about laser, not only among the teaching staff but also among the academics. Thus, they defend the idea of implanting a laser discipline in the Dentistry curriculum. It must be taken into consideration that when a subject or content is not covered during the undergraduate course, it may decrease the students' interest in this undiscussed area, since they are not informed about its benefits, importance, and sector. This can lead to a lower demand of these students for a qualification course after graduation.

However, the current DCN¹³ for Dentistry courses, in its Article 18, reinforces the need for an integrated curriculum, based on interdisciplinarity and articulation among its various dimensions. Thus, more than the existence of a discipline, it is important to include this theme in the curriculum.

5 CONCLUSION

There is a considerable level of knowledge about lasers among the teachers of the Dentistry course at the Federal University of Espírito Santo. However, there is a lack of dissemination of information in the different disciplines of the course and a low applicability of this tool.

RESUMO

Percepção dos docentes de um curso de Odontologia sobre a terapia a *laser* de baixa intensidade

A tendência da Odontologia é a incorporação de métodos menos invasivos. Por isso, acredita-se que a terapia a *laser* de baixa intensidade (TLBI) seja uma opção de tratamento, na medida em que apresenta efeitos benéficos comprovados. O presente estudo tem o objetivo de traçar o padrão de ensino e a percepção dos professores sobre o uso de terapia a *laser* de baixa intensidade no curso de graduação em Odontologia da Universidade Federal do Espírito Santo. Além disso, busca analisar a presença da disciplina de laserterapia nos cursos de Odontologia

brasileiros. A pesquisa foi realizada a partir de um estudo analítico, transversal e descritivo, com a aplicação de um questionário a 44 professores da Odontologia da Universidade Federal do Espírito Santo. A partir deste estudo obteve-se que 9% de todo corpo docente afirmou utilizar o *laser* em alguma das atividades das disciplinas que ministram, sendo que esta baixa porcentagem foi justificada pelos professores devido à falta de recurso financeiro para obtenção dos aparelhos. Foi observado que a maior parte do corpo docente já teve conhecimento sobre o *laser*, sendo 45,4% durante a pós-graduação. Quando avaliada a estrutura curricular das 461 instituições de ensino superior brasileiras de Odontologia em atividade, 13 oferecem a disciplina de laserterapia em sua matriz curricular. Pode-se concluir que existe um considerável nível de conhecimento sobre o *laser* entre os docentes. Porém, nota-se pouca disseminação de informação nas diferentes disciplinas do curso estudado.

Descritores: Terapia a *Laser*.

Educação em Odontologia.

Currículo.

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