NEVADA STATE BOARD of DENTAL EXAMINERS

Continuing education Committee Meeting

Monday August 16, 2021

6:00 p.m.

PUBLIC BOOK

Agenda Items:
(4)(a) NAC 631.035

NAC 631.035 Use of laser radiation in practice: Adoption by reference of *Curriculum Guidelines and Standards for Dental Laser Education*. (NRS 631.190)

1. The Board hereby adopts by reference the *Curriculum Guidelines and Standards for Dental Laser Education*, adopted by the Academy of Laser Dentistry. The *Curriculum Guidelines and Standards for Dental Laser Education* is available, free of charge, from the Academy of Laser Dentistry:

(a) By mail, at P.O. Box 8667, Coral Springs, Florida 33075;

(b) By telephone, at (954) 346-3776; or

(c) At the Internet address **http://www.laserdentistry.org/prof/edu_curriculumguidelines.cfm**.

2. The Board will periodically review the *Curriculum Guidelines and Standards for Dental Laser Education* and determine within 30 days after the review whether any change made to those guidelines and standards is appropriate for application in this State. If the Board does not disapprove a change to an adopted guideline or standard within 30 days after the review, the change is deemed to be approved by the Board.

(Added to NAC by Bd. of Dental Exam'rs by R139-05, eff. 12-29-2005)

Agenda Item (4)(a):
Dental Laser Coaching- Nick Clausen, MBA, PMP

Nevada State Board of Dental Examiners
6010 S. Rainbow Blvd., Bldg. A, Ste. 1
Las Vegas, NV 89118
(702) 486-7044 • (800) DDS-EXAM • Fax (702) 486-7046

Received
JAN 20 2021
NSBDE

PROVIDER APPROVAL APPLICATION: LASER RADIATION PROFICIENCY PROGRAM

Instructor(s) Name: NICK CLAUSEN

Program Title and Objectives [Must relate directly to the practice of dentistry and/or dental hygiene]:

Title, Objectives, Synopsis, Bio, AGD Codes, Pre-requisites & Itinery Attached

Number of Participants: 8
Hours of Actual Instruction (didactic/hands-on): 6
Facility Name and Address

YTBD

Date(s) of Program: YTBD
Entity Submitting Request: NICK CLAUSEN, Dental Laser Coaching
Business Address: 1309 Enterprise Way
City, State & Zip: Carson City, NV 89703
Business Telephone: (816) 506-4368
Date of Request: January 20, 2021

Nick Clausen

Signature of Person Authorized to Represent Program

PLEASE ATTACH NAME(S) AND CURRICULUM VITAE(S) FOR EACH INSTRUCTOR, THE OUTLINE OF COURSE (including method of presentation), AND A LETTER SIGNED BY THE PERSON(S) WHO HOLD PROPRIETARY RIGHTS TO THE PROGRAM GRANTING THE BOARD PERMISSION TO REVIEW THEIR PROGRAM.

FOR OFFICE USE ONLY - DO NOT WRITE BELOW THIS LINE.

Approved by:

Number of Hours Approved:
Effective Date of Approval:
Disapproved [Explanation]:

PAID
#1108

Form 10/2019

Agenda Item 4 (a):
Minutes from 04/20/2021 Meeting

FOR REFERENCE PURPOSES:

Minutes from CE Committee 4/20/2021 for OLD BUSINESS - ITEM 4

DENTAL LASER COACHING

Nevada State Board of Dental Examiners

6010 S. Rainbow Blvd., Bldg. A, Ste.1 • Las Vegas, NV 89118 • (702) 486-7044 • (800) DDS-EXAM • Fax (702) 486-7046

NOTICE OF AGENDA & TELECONFERENCE MEETING FOR THE CONTINUING EDUCATION COMMITTEEE

(Ronald Lemon, DDS (Chair); Elizabeth Park, DDS; D. Kevin Moore, DDS; Adam York, DDS; Yamilka Arias, RDH)

Meeting Date & Time

Tuesday, April 20, 2021
6:00 p.m.

This meeting will be held exclusively through teleconference means, in accordance with Emergency Directives issued by Governor Sisolak

Teleconference Number: (669) 900 6833
Teleconference ID#: 970 5079 0745
Teleconference Passcode: 469895

PUBLIC NOTICE:

***** This meeting will be held via TELECONFERENCE ONLY, pursuant to Section 1 of the DECLARATION OF EMERGENCY DIRECTIVE 006 ("DIRECTIVE 006") issued by the State of Nevada Executive Department and as extended by Directives 016, 018, 021, 026, and 029. There will be no physical location for this meeting*****

Public Comment by pre-submitted email/written form, only, is available after roll call (beginning of meeting); **Live Public Comment by teleconference** is available prior to adjournment (end of meeting). Live Public Comment is limited to three (3) minutes for each individual.

Pursuant to Section 2 of Directive 006, members of the public may participate in the meeting by submitting public comment in written form to: **Nevada State Board of Dental Examiners, 6010 S. Rainbow Blvd, A-1, Las Vegas, Nevada 89118; FAX number (702) 486-7046; e-mail address** nsbde@nsbde.nv.gov. Written submissions received by the Board on or before **Monday, April 19, 2021 by 4:00 p.m.** may be entered into the record during the meeting. Any other written public comment submissions received prior to the adjournment of the meeting will be included in the permanent record.

The Nevada State Board of Dental Examiners may 1) address agenda items out of sequence to accommodate persons appearing before the Board or to aid the efficiency or effectiveness of the meeting; 2) combine items for consideration by the public body; 3) pull or remove items from the agenda at any time. The Board may convene in closed session to consider the character, alleged misconduct, professional competence or physical or mental health of a person. See NRS 241.030. Prior to the commencement and conclusion of a contested case or a quasi-judicial proceeding that may affect the due process rights of an individual the board may refuse to consider public comment. See NRS 233B.126.

Persons/facilities who want to be on the mailing list must submit a written request every six (6) months to the Nevada State Board of Dental Examiners at the address listed in the previous paragraph. With regard to any board meeting or telephone conference, it is possible that an amended agenda will be published adding new items to the original agenda. Amended Nevada notices will be posted in compliance with the Open Meeting Law.

We are pleased to make reasonable accommodations for members of the public who are disabled and wish to attend the meeting. If special arrangements for the meeting are necessary, please notify the Board, at (702) 486-7044, no later than 48 hours prior to the meeting. Requests for special arrangements made after this time frame cannot be guaranteed.

Pursuant to NRS 241.020(2) you may contact at (702) 486-7044, to request supporting materials for the public body or you may download the supporting materials for the public body from the Board's website at [illegible]. In addition, the supporting materials for the public body are available at the Board's office located at 6010 S Rainbow Blvd, Ste. A-1, Las Vegas, Nevada.

Note: Asterisks (*) **"For Possible Action"** denotes items on which the Board may take action.
Note: Action by the Board on an item may be to approve, deny, amend, or tabled.

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1. **Call to Order**
   - Roll call/ Quorum

Dr. Lemon (Chairman)—PRESENT	Dr. York—EXCUSED
Dr. Park—PRESENT	Ms. Arias—PRESENT
Dr. Moore--PRESENT	

2. **Public Comment (By pre-submitted email/written form):** The public comment period is limited to matters specifically noticed on the agenda. No action may be taken upon the matter raised during public comment unless the matter itself has been specifically included on the agenda as an action item. Comments by the public may be limited to three (3) minutes as a reasonable time, place and manner restriction, but may not be limited based upon viewpoint. The Chairperson may allow additional time at his/her discretion.

Pursuant to Section 2 of Directive 006, and extended by Directives 016, 018, 021, 026, and 029, members of the public may participate in the meeting without being physically present by submitting public comment via email to nsbde@nsbde.nv.gov, or by mailing/faxing messages to the Board office. Written submissions received by the Board on or before **Monday, April 19, 2021 by 4:00 p.m.** may be entered into the record during the meeting. Any other written public comment submissions received prior to the adjournment of the meeting will be included in the permanent record.

In accordance with Attorney General Opinion No. 00-047, as restated in the Attorney General's Open Meeting Law Manual, the Chair may prohibit comment if the content of that comment is a topic that is not relevant to, or within the authority of, the Nevada State Board of Dental Examiners, or if the content is willfully disruptive of the meeting by being irrelevant, repetitious, slanderous, offensive, inflammatory, irrational, or amounting to personal attacks or interfering with the rights of other speakers.

Mr. DiMaggio read the written Public Comment parameters. There were no written public comments.

*3. **Chairman's Report**: *Ronald Lemon, DDS* (For Possible Action)

Dr. Lemon said he does not have anything to report.

(a) **Request to remove agenda item(s)** (For Possible Action)

There were no agenda items removed.

(b) **Approve Agenda** (For Possible Action)

Dr. Moore made a motion to accept the agenda as written. Dr. Park seconded the motion. All were in favor. The motion passed.

*4. **Old Business:** (For Possible Action)

*a. **Discussion, consideration, and possible recommendations to the Board regarding approval/rejection of Laser Proficiency Program** – NAC 631.035 (For Possible Action)

This Item was Tabled.

(1) Dental Laser Coaching – "A Comprehensive Dental Laser Technology Overview with Clinical Keys to Optimize Laser Utilization Safely and Effectively" – (6 units)

Dr. Lemon said he would like to hear from Mr. Clausen.
Dr. Lemon stated that Mr. Clausen is not a dentist but is approved as a presenter for the laser courses.
Mr. Clausen stated that he is on the approved provider list for laser dentistry.
Dr. Lemon asked if he teaches the academic portion and the hands on portion of the course.
Mr. Clausen stated yes he is keeping to a 1:8 ratio for hands on portion.
Dr. Lemon asked are you teaching any ablated procedures.
Mr. Clausen stated that he is not teaching procedures that he is teaching safety, physics and the foundational knowledge of the laser and how they interact with various tissues. He also shows clinical videos and interactions with the particular laser and with certain chromaphores but he does not tell the doctor what to do; he just tells them how it interacts with various tissues.
Dr. Lemon asked at the end of Mr. Clausen's course, the doctor is certified and he can perform laser procedures.
Mr. Clausen answered that was correct.

Dr. Lemon said that was where his problem is with that. He feels that a dentist that has the hands-on experience should be teaching the hands on component of the course.
Mr. Clausen said he could see where Dr. Lemon would have a problem with him teaching live clinical techniques, however he can teach the doctors how to utilize the equipment optimally based on the various tissue types. he said he is not teaching dentistry. This is a foundational course not an advanced course to become proficient.
Dr. Lemon stated that Mr. Clausen's course is very thorough and you could learn how to use a laser based off his lecture material, however he still has concerns.
Dr. Lemon asked the committee members if there were any comments and asked if a dentist has to teach a laser course.
Mr. Clausen stated that his course is all in-vitro.
Dr. Lemon clarified that ultimately that the laser will be used on humans.
Dr. Moore agrees with Dr. Lemon that a dentist should be teaching other dentists on the clinical portion of the course.
Dr. Lemon did state that pursuant to NAC 631.190, we have the ability to review courses and make recommendations.
Dr. Park agrees with Dr. Lemon and Dr. Moore.
Dr. Lemon asked Mr. Clausen if it is possible for a doctor to be included in the teaching of the course.
Mr. Clausen said yes it is possible.
Dr. Lemon said that would address his concerns.
Ms. Arias agrees with the committees concerns. She said that she has taken 2 separate courses for laser and they have been taught by hygienists and she has never seen a course like this particular one before taught by a non-clinical person. Ms. Arias asked if he had been approved to teach other dental Boards in other states.
Mr. Clausen stated that Nevada is one of the only states with this requirement, that most other states the manufactures requirement is adequate. He stated that he travels all over the country and does a training similar to the one presented. He stated that he has been teaching for 15 years and when you take an advanced course he is on the review board. He said that he helped come up with the guidelines that are being followed.
Dr. Park stated that it would be nice to have a clinician to round out the experience if things do not go as planned. She asked if he has a clinician to bring it back to the board. She asked if it would be a Nevada clinician. She said it would be helpful if their licenses were in good standing with the Board and in Nevada.
Mr. Clausen asked if the clinician had to be a licensed clinician in Nevada or can they be from other states as well.
Dr. Lemon said he was ok with other states as long as they are licensed,.
Mr. Clausen stated that there is no live patient involved in this course.
Mr. Clausen said that he is on the educational committee for the ALD and he would ask various dentists that are on the committee that are on the speakers bureau that are accredited dentists if they would be willing to help.
Mr. Clausen stated that this is challenging in Nevada because it is a multi-wavelength course instead of a single wavelength course and that present challenges. He said that he could have a long list of dentists to present to the board.
Mr. Clausen asked if there was an additional doctor that could be added in the future is that possible or is the initial list set in stone.
Dr. Moore said that there may be some paperwork involved however yes you can add names in the future as long as the doctor is certified and licensed there could be add-ons and that you are not locked in forever with the initial list provided and that the Board needs to be kept up to date.
Dr. Moore made a motion a motion to table the agenda item until Mr. Clausen modifies curriculum and Mr. Clausen provides the list of doctors for the hands-on portion of the course. Dr. Park seconded the motion. All were in favor. There was no further discussion. The motion passed.

***5. New Business:** (For Possible Action)

***a. Review, consideration, and discussion on possible recommendations to the Full Board whether to adopt and add three (3) dental specialties, namely Dental Anesthesiology, Oral Medicine, and Orofacial Pain, by amendment or modification to NAC 631.190 (For Possible Action)**

Dr. Moore made a Motion to recommend to the Board the 3 dental specialties listed in the agenda item.
Dr. Park seconded the motion.
All were in favor. Motion passed.
Mr. DiMaggio clarified that the vote was, that this recommendation go to the full Board.
Dr. Lemon said yes all the recommendations are for the full Board.

***b. Review, consideration, and discussion on possible recommendations to the Full Board regarding approval/rejection for request to ratify approval of the Laser Proficiency Program to include additional instructor(s)** – NAC 631.035 **(For Possible Action)**

(1) Provider: Dedicated Dental Hygiene – Program: Introduction to Lasers
(a) Jennifer Long, RDH

(2) Provider: Advanced Dental Hygiene - Program: Diode Laser Training & Certification
(a) Janessa Bock, RDH

Dr. Moore made a motion to recommend to the Board approval of the request to ratify the Introduction to Lasers program to include additional instructor, Jennifer Long, RDH.
Ms. Arias seconded the motion. There was no discussion. All were in favor. The motion passed.

Dr. Park made a motion to recommend to the Board approval of the request to ratify this particular program Diode Laser Training and Certification, to include additional instructor, Janessa Bock, RDH. Ms. Arias seconded the motion.
All were in favor. The motion passed

6. **Public Comment (Live public comment by teleconference):** This public comment period is for any matter that is within the jurisdiction of the public body. No action may be taken upon the matter raised during public comment unless the matter itself has been specifically included on the agenda as an action item. Comments by the public may be limited to three (3) minutes as a reasonable time, place and manner restriction, but may not be limited based upon viewpoint. The Chairperson may allow additional time at his/her discretion.

Pursuant to Section 2 of Directive 006, and extended by Directives 016, 018, 021, 026, and 029, members of the public may participate in the meeting without being physically present by submitting public comment via email to [redacted], or by mailing/faxing written messages to the Board office. Written submissions should be received by the Board on or before **Monday, April 19, 2021 by 4:00 p.m.** in order to make copies available to members and the public.

In accordance with Attorney General Opinion No. 00-047, as restated in the Attorney General's Open Meeting Law Manual, the Chair may prohibit comment if the content of that comment is a topic that is not relevant to, or within the authority of, the Nevada State Board of Dental Examiners, or if the content is willfully disruptive of the meeting by being irrelevant, repetitious, slanderous, offensive, inflammatory, irrational, or amounting to personal attacks or interfering with the rights of other speakers.

Mr. DiMaggio read live public comment parameters. There were no live public comments.

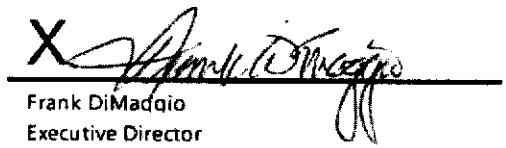
7. **Announcements**

There were no announcements.

***8. Adjournment** (For Possible Action)

Dr. Moore made a motion to adjourn. Dr. Park seconded the motion. All were in favor. The meeting was adjourned at 6:40 pm

PUBLIC NOTICE POSTED TO:
Nevada State Board of Dental Examiners website: [redacted]
Nevada Public Posting Website: [redacted]

X 

Frank DiMaggio
Executive Director

Agenda Item 4 (a):
Curriculum Guidelines & Standards for Dental Laser Education

Curriculum guidelines and standards for dental laser education

Joel M. White et al.
University of California, San Francisco, Box 0758, San Francisco, CA 94143-0758

ABSTRACT

This paper reports on the revision of the Curriculum Guidelines and Standards for Dental Laser Education. The original Guidelines were developed at a workshop at the University of California, San Francisco School of Dentistry in 1992, presented at the January 1993 SPIE symposium, and published in SPIE Proceedings Vol. 1880. They have since been endorsed and implemented worldwide. The Guidelines define the standard of education for practitioners who use lasers, with a goal to enhance of student and practitioner understanding and knowledge of laser technology applications in dentistry. Four levels of education are outlined. Introductory Courses are designed to provide general information on lasers in dentistry. They are informational, without an assessment of the student's proficiency in laser use. Standard Proficiency, Advanced Proficiency, and Educator Courses have specific educational goals, behavioral objectives, and examinations of proficiency. Standard Proficiency Courses provide a basic level of education with didactic, laboratory, and clinical exercises to be satisfactorily completed before using lasers clinically. Advanced Proficiency Courses increase this level of education to include a clinical case study requirement. Educator Courses define requirements for instructors of laser education in dentistry. Revision of the Guidelines ensures that they keep pace with technological developments and research findings.

Keywords: curriculum, laser education, dentistry

1. STATEMENT OF PURPOSE

This document provides guidelines to assure safe and efficacious use of lasers for the health and welfare of the patient. It establishes the standards of education in the use of lasers in dentistry and defines standards for the demonstration of competency. It is intended to provide guidance to practitioners and educators and to reassure the public on the issues of education, competency, and quality of care in the use of laser in dentistry. These Guidelines do not restrict, limit, or regulate the application of this technology. The curriculum outlined in this document is the standard of education in laser dentistry.

2. INTRODUCTION

The curriculum guidelines for dental laser education were developed through a consensus process with members from dental laser organizations, academia, industry and private practice. The original document was developed at a workshop on the development of standards for dental laser education held at the University of California, San Francisco on July 25 and 26, 1992. It was revised most recently on October 3, 1998 at that same location with concurrent laser instructor certification. The purpose of these workshops was to provide the mechanism for the development and revision of the standard of education for the use of lasers in dentistry.

The document was developed using recommendations from a wide range of information that exists on the use of lasers and are appropriately referenced. The format of this document is in the style of curriculum guidelines as published by the American Association of Dental Schools. As a matter of course these guidelines are circulated among dental laser educators, researchers, practitioners, organized dentistry and members of industry. This document is widely distributed and updated periodically. Questions or suggestions may be addressed to the authors of this document.

Laser applications in dentistry have specific indications and contraindications for use in treatment. A working knowledge of dental laser basic, applied, and clinical science is essential.

The manufacture, marketing, and distribution of dental lasers are controlled throughout the world by various regulatory agencies; e.g., in the United States the U.S. Food and Drug Administration; in Germany, ordinances such as MPG et al. as well as regulatories given by the Berufsgenossenschaften (VBG); and in Brazil, by the Associacao Brasileira de Normas

Tecnicas (ABNT). These regulatory bodies control dental laser manufacturers but do not regulate the dental practitioner in the use of these devices. Hospitals and institutions have their own credentialing programs for use of specific devices in their facilities. The use of dental lasers does not comprise the basis for a dental specialty, but it does require a level of education for their safe use in dentistry.

3. EDUCATIONAL STRUCTURE

The goal of these curriculum guidelines and standards of education is to enhance understanding and knowledge of the application of laser technology in dentistry.

There are four courses of dental laser education outlined in this document. Introductory Course offers general information but does not assess the enrollee's proficiency. Standard Proficiency Course offers a level of education including instruction, hands-on exercises, and examination. This course must be satisfactorily completed before independently using lasers. Advanced Proficiency Course offers a level of education including instruction, hands-on exercises, clinical case studies and examination. Educator Course offers instruction for teaching lasers in dentistry.

4. EDUCATIONAL PARAMETERS

Practitioners must have training with demonstrated proficiency, knowledge and skill for use of lasers in dentistry. Training must include specific objectives and requirements described below, with demonstration of knowledge and proficiency. Competency evaluation should include both written and clinical examination. Evaluation of competency of practitioners must be assessed by a trained educator.

Practitioner use of lasers must be limited to those devices in which the manufacturer has met the regulatory requirements such as Center for Devices and Radiological Health of the U.S. Food and Drug Administration for that product. Manufacturers must meet the requirements and regulations of the Food and Drug Administration. Manufacturers should provide both an operators manual and recommended clinical usage, supported by preclinical and clinical research. Practitioners should use these devices with a sound knowledge of indications and contraindications and within the scope of the practice based on competence as established by education, training and experience. Dental auxiliaries within their scope of education, training and experience must also have specific safety training and demonstrated proficiency in proper laser safety.

Practitioners must have a knowledge of basic laser physics, laser-tissue interaction, and specific laser safety requirements for the dental treatment area. They must also have a knowledge of the device and basic laser and biologic interactions including the safety recommendations outlined in the American National Standard for the Safe Use of Lasers and American National Standard for the Safe Use of Lasers in Health Care Facilities. And they must have a knowledge of laser properties including wavelength, absorption, reflection, transmission, scatter, emission modes, delivery systems, beam characteristics and divergence. Practitioners must furthermore demonstrate knowledge of photothermal, photochemical, photoacoustic, and biostimulation events, tissue absorption characteristics, and the effects of wavelength, spot size, power, exposure duration, energy density, and repetition rate.

Practitioners must know and demonstrate the treatment objective, such as ablation, coagulation, and excision. They must have demonstrated knowledge of appropriate settings to attain specific treatment outcomes supported by research. And they must be able to recognize successful treatment outcomes, manage adverse effects, and must have knowledge of the adverse effect reporting mechanism.

It is the responsibility of the dental practitioner to follow the standard of education as defined by these guidelines.

5. COURSE OUTLINES

5.1 Introductory Course

Introductory courses are intended to be educational, informational and primarily didactic. This level of education is intended for anyone interested in lasers in dentistry.

I. Introduction
- A. Self-graded pre-test (optional)

II. Fundamentals of lasers
- A. Production of laser light
  - 1. Quantum theory
  - 2. Stimulated emission
- B. Electromagnetic spectrum
  - 1. Regions and boundaries
    - a. Ultraviolet (1 – 400 nm)
    - b. Visible (400 – 750 nm)
    - c. Infrared (750+ nm)
  - 2. Laser wavelengths
- C. Characteristics of laser light
  - 1. Spatial and temporal coherency
  - 2. Monochromaticity
  - 3. Collimation
- D. Laser requirements, delivery systems and emission modes
  - 1. Laser cavity
    - a. Active medium
    - b. Pumping mechanism
    - c. Optical resonator
  - 2. Delivery systems
    - a. fixed lens and mirror
    - b. articulated arm
    - c. Waveguide
    - d. Optical fiber
  - 3. Emission mode
    - a. Continuous wave
    - b. Chopped or gated
    - c. Pulsed
- E. Summary of laser effects on tissue
  - 1. Reflection, scattering, transmission, absorption
  - 2. Photothermal effects
    - a. Warming
    - b. Coagulation, tissue shrinkage, hemostasis
    - c. Vaporization, ablation
    - d. Carbonization
  - 3. Photoacoustic effect
    - a. Disruption
  - 4. Photochemical effects
    - a. Stimulation of chemical reactions
    - b. Breaking of molecular bonds
  - 5. Fluorescence
  - 6. Biostimulation
    - a. Photodynamic therapy

III. Review of types of lasers, delivery systems, special device characteristics, and clinical applications in dentistry
- A. Laser types
  - 1. Argon laser
  - 2. CO_2 laser
  - 3. Diode lasers
  - 4. Erbium lasers
  - 5. Holmium laser
  - 6. Neodymium lasers
  - 7. Other lasers
- B. Device characteristics
  - 1. Wavelength
  - 2. Beam diameter (spot size)
  - 3. Power
  - 4. Energy density
  - 5. Repetition rate (if applicable)
  - 6. Exposure duration
  - 7. Total energy

C. Clinical applications
   1. Intraoral soft tissue surgery
   2. Treatment of apththous ulcers
   3. Sulcular debridement (soft tissue curettage)
   4. Composite curing
   5. Tooth shade lightening
   6. Caries removal
   7. Cavity preparation
   8. Enamel modification
   9. Illumination for caries detection
   10. Illumination for endodontic orifice location
   11. Removal of coronal pulp
   12. Experimental applications

IV. Laser safety
   A. Standards, organizations, and regulatory requirements
      1. U.S. FDA Center for Devices and Radiological Health (CDRH)
      2. American National Standards Institute (ANSI)
      3. U.S. Occupational Safety and Health Administration (OSHA)
      4. State and local regulatory agencies
   B. Laser safety officer
   C. Laser safety mechanisms
   D. Adverse effects reporting mechanism
   E. Eye and tissue protection
   F. Environment
      1. Proper warning sign posted
      2. Limited access
      3. Reflective surfaces minimized
   G. High volume evacuation present
   H. Laser external cooling system (if applicable)
   I. Electrical components (cords and footswitch)
   J. Gases
   K. Training
   L. Laser use documentation

V. Infection control
   A. Identification and disposal of biologic hazards
   B. Plume hazards and precautions
   C. Sterilization

VII. Post-test examination (optional)

5.2 Standard Proficiency Course

The curriculum for basic level of education in laser usage includes specific device instruction with demonstrated proficiency in didactic and hands-on knowledge. Hands-on exercises include demonstration and clinical simulation with appropriate oral tissues (e.g. cow or pig jaws), and must meet participation course guidelines. Practitioners must demonstrate competency by written and clinical simulation and examination in the safety aspects of laser use prior to using lasers on patients. This is the level of education that defines the standard of care. Dental auxiliaries are encouraged to demonstrate competency in the safety aspects of laser use. Industry representatives, researchers, and others who demonstrate and operate lasers must demonstrate competency by written and clinical simulation and examination in the safety aspects of laser use.

I. Introduction
   A. Self-graded pre-test (optional)

II. Fundamentals of lasers
   A. Production of laser light
      1. Quantum theory
      2. Stimulated emission
   B. Electromagnetic spectrum
      1. Regions and boundaries
         a. Ultraviolet (1 – 400 nm)
         b. Visible (400 – 750 nm)
         c. Infrared (750+ nm)
      2. Laser wavelengths

C. Characteristics of laser light
   1. Spatial and temporal beam coherency
   2. Monochromaticity
   3. Collimation

D. Laser requirements, delivery systems and emission modes
   1. Laser cavity
      a. Active medium
      b. Pumping mechanism
      c. Optical resonator
   2. Delivery systems
      a. Fixed lens and mirror
      b. Articulated arm
      c. Waveguide
      d. Optical fiber
   3. Emission mode
      a. Continuous wave
      b. Chopped or gated
      c. Pulsed

E. Summary of laser effects on tissue
   1. Reflection, scattering, transmission, absorption
   2. Photothermal effects
      a. Warming
      b. Coagulation, tissue shrinkage, hemostasis
      c. Vaporization, ablation
      d. Carbonization
   3. Photoacoustic effect
      a. Disruption
   4. Photochemical effects
      a. Stimulation of chemical reactions
      b. Breaking of molecular bonds
   5. Fluorescence
   6. Biostimulation
      a. Photodynamic therapy

III. Review of laser types, device characteristics, and clinical applications in dentistry

A. Laser types
   1. Argon laser
   2. CO_2 laser
   3. Diode lasers
   4. Erbium lasers
   5. Holmium laser
   6. Neodymium lasers
   7. Other lasers

B. Device characteristics
   1. Wavelength
   2. Beam diameter (spot size)
   3. Power
   4. Energy density
   5. Repetition rate (if applicable)
   6. Exposure duration
   7. Total energy

C. Clinical applications
   1. Intraoral soft tissue surgery
   2. Treatment of aphthous ulcers
   3. Sulcular debridement (soft tissue curettage)
   4. Composite curing
   5. Tooth shade lightening
   6. Caries removal
   7. Cavity preparation
   8. Enamel modification
   9. Illumination for caries detection
   10. Illumination for endodontic orifice location
   11. Removal of coronal pulp
   12. Experimental applications

IV. Laser safety

A. Standards organizations and regulatory requirements
   1. U.S. FDA Center for Devices and Radiological Health (CDRH)
   2. American National Standards Institute (ANSI)
   3. U.S. Occupational Safety and Health Administration (OSHA)
   4. State and local regulatory agencies

B. Laser safety officer

C. Laser safety mechanisms

D. Adverse effects reporting mechanism

E. Eye and tissue protection

F. Environment
   1. Proper warning sign posted
   2. Limited access
   3. Reflective surfaces minimized

G. High volume evacuation present

H. Laser external cooling system (if applicable)

I. Electrical components (cords and footswitch)

J. Gases

K. Training

L. Laser use documentation

V. Clinical simulation (specific hands-on demonstration)
   A. Laser instrument set-up and operation
      1. Delivery system
         a. Type
         b. Assembly
         c. Inspection
         d. Maintenance
         e. Sterilization standards and protocol
      2. Set laser operating parameters
      3. Test fire laser
   B. Infection control
      1. Identification and disposal of biologic hazards
      2. Plume hazards and precautions
      3. Sterilization
   C. Treatment objective and surgical technique simulation on bovine tissues or other suitable biologic tissues or inanimate objects
      1. Indications and contraindications of laser use in dentistry
      2. Alternate methods of treatment
   D. Discussion of treatment sequence, patient management, postoperative instructions
   E. Management of complications
   F. Surgical and healing assessment

V. Practice management
   A. Practice organization and management, staff training and patient education
   B. Financial and insurance considerations
   C. Malpractice considerations, jurisprudence, ethics
   D. Record keeping, adverse effects reporting mechanism, informed consent

VI. Laser bibliography
   A. General bibliography for lasers in dentistry
   B. Subject bibliography for specific dental applications

VII. Current research and future developments

IX. Conclusion
   A. Written post-test
   B. Post-test clinical simulation
   C. Course evaluation
   D. Certificate of attendance

Advanced Proficiency Course

Practitioners must have successfully completed a Category II course. Practitioners then gain additional knowledge and experience by one or more of the following:

1. In-office mentor preceptor program
2. University or other accredited dental education program
3. Scientific session educational program
4. Patient care
5. Independent study of the literature

This level of education is elective, and represents an advanced level of clinical competency in safety and clinical use. This level of education is intended for Dentists and Dental Hygienists and includes assessment by written examination, clinical simulation proficiency, and clinical case presentation. This level is also intended for dental auxiliaries, industry representatives, researchers, and others who demonstrate and operate lasers. Assessment of these individuals is by written and clinical simulation proficiency in the safety aspects of laser use.

I. Introduction
   A. Self-graded pre-test (optional)

II. Fundamentals of lasers
   A. Production of laser light
      1. Quantum theory
      2. Stimulated emission
   B. Electromagnetic spectrum
      1. Regions and boundaries
         a. Ultraviolet (1 – 400 nm)
         b. Visible (400 – 750 nm)
         c. Infrared (750+ nm)
      2. Laser wavelengths
   C. Characteristics of laser light
      1. Spatial and temporal beam coherency
      2. Monochromaticity
      3. Collimation
   D. Laser requirements, delivery systems and emission modes
      1. Laser cavity
         a. Active medium
         b. Pumping mechanism
         c. Optical resonator
      2. Delivery systems
         a. Fixed lens and mirror
         b. Articulated arm
         c. Waveguide
         d. Optical fiber
      3. Emission mode
         a. Continuous wave
         b. Chopped or gated
         c. Pulsed
   E. Summary of laser effects on tissue
      1. Reflection, scattering, transmission, absorption
      2. Photothermal effects
         a. Warming
         b. Coagulation, tissue shrinkage, hemostasis
         c. Vaporization, ablation
         d. Carbonization
      3. Photoacoustic effect
         a. Disruption
      4. Photochemical effects
         a. Stimulation of chemical reactions
         b. Breaking of molecular bonds
      5. Fluorescence
      6. Biostimulation
         a. Photodynamic therapy

III. Review of laser types, device characteristics, and clinical applications in dentistry
   A. Laser types
      1. Argon laser
      2. CO_2 laser
      3. Diode lasers
      4. Erbium lasers
      5. Holmium laser
      6. Neodymium lasers
      7. Other lasers
   B. Device characteristics
      1. Wavelength
      2. Beam diameter (spot size)
      3. Power
      4. Energy density
      5. Repetition rate (if applicable)
      6. Exposure duration
      7. Total energy
   C. Clinical applications
      1. Intraoral soft tissue surgery
      2. Treatment of aphthous ulcers
      3. Sulcular debridement (soft tissue curettage)
      4. Composite curing
      5. Tooth shade lightening
      6. Caries removal
      7. Cavity preparation
      8. Enamel modification
      9. Illumination for caries detection
      10. Illumination for endodontic orifice location
      11. Removal of coronal pulp
      12. Experimental applications

IV. Laser safety
- A. Standards, organizations, and regulatory requirements
  1. U.S. FDA Center for Devices and Radiological Health (CDRH
  2. American National Standards Institute (ANSI)
  3. U.S. Occupational Safety and Health Administration (OSHA)
  4. State and local regulatory agencies
- B. Laser safety officer
- C. Laser safety mechanisms
- D. Adverse effects reporting mechanism
- E. Eye and tissue protection
- F. Environment
  1. Proper warning signs posted
  2. Limited access
  3. Reflective surfaces minimized
- G. High volume evacuation present
- H. Laser external cooling system (if applicable)
- I. Electrical components (cords and footswitch)
- J. Gases
- K. Training
- L. Laser use documentation

V. Clinical simulation (specific hands-on demonstration)
- A. Laser instrument set-up and operation
  1. Delivery system
     a. Type
     b. Assembly
     c. Inspection
     d. Maintenance
     e. Sterilization standards and protocol
  2. Set laser operating parameters
  3. Test fire laser
- B. Infection control
  1. Identification and disposal of biologic hazards
  2. Plume hazards and precautions
  3. Sterilization
- C. Treatment objective and surgical technique simulation on bovine tissues or other suitable biologic tissues or inanimate objects
  1. Indications and contraindications of laser use in dentistry
  2. Alternate methods of treatment
- D. Discussion of treatment sequence, patient management, postoperative instructions
- E. Management of complications
- F. Surgical and healing assessment
- G. Post-test clinical simulation

VI. Clinical summary of laser usage
- A. Pretreatment
  1. Diagnostic tests
     a. Clinical exams
     b. Tooth vitality
     c. Hard tissue tests
     d. Radiographics
     e. Soft tissue exams, including pocket depth measurement (if applicable)
     f. Other
  2. Diagnosis and treatment plan
     a. Diagnosis
     b. Treatment
     c. Possible treatment alternatives
     d. Indication
     e. Contraindications
     f. Informed consent
- B. Treatment
  1. Objective
  2. Laser operating parameters
     a. Wavelength
     b. Power
     c. Repetition rate (if applicable)
     d. Beam diameter (spot size)
     e. Exposure duration
  3. Treatment sequence
  4. Management of complications
  5. Surgical prognosis
  6. Treatment record
  7. Patient management
  8. Post-operative instructions

C. Follow-up care
   1. Side effects and complications (if any)
   2. Assessment of treatment (with time intervals)
   3. Long-term results
   4. Healing assessment
   5. Case documentation

VII. Practice management
   A. Practice organization and management, staff training and patient education
   B. Financial and insurance considerations
   C. Malpractice considerations, jurisprudence, ethics
   D. Record keeping, adverse effects reporting mechanism, informed consent

VIII. Laser bibliography
   A. General bibliography for lasers in dentistry
   B. Subject bibliography for specific dental applications

IX. Current research and future developments

IX. Conclusion
   A. Written post-test
   B. Clinical simulation (post-test)
   C. Clinical case studies
   D. Course evaluation
   E. Certificate of attendance

Educator Course
This course provides specific instruction in planning and presenting the Standard Proficiency Course. Course structure is both lecture and participation. Prerequisites include three years participation in Standard Proficiency level and two years status at Advanced Proficiency.

I. Introduction
   A. Teaching lectures, small groups, laboratories, case studies
   B. How students learn
   C. Videotaping assessments of teacher skills
   D. Critique and feedback on teaching technique

II. How to teach
   A. Critical thinking
      1. Optimal learning experiences
      2. Criteria
   B. Learning modalities
      1. Visual
      2. Auditory
      3. Kinesthetic
      4. Tactile
      5. Olfactory
      6. Gustatory
   C. Multiple intelligence
      1. Logical-mathematical
      2. Linguistic
      3. Musical
      4. Bodily/Kinesthetic
      5. Interpersonal
      6. Intrapersonal
   D. Creativity in Teaching
      1. Problem presentation
      2. Preparation
      3. Generation of ideas
      4. Incubation
      5. Validation
      6. Outcome assessment

III. Teaching excellence in laser dentistry
- A. Focus on selected content
- B. Use of eye movement, continuous eye contact
- C. Use of body movement
- D. Use of gestures for emphasis
- E. Use of language – metaphors, storytelling, personal experience, anecdotes
- F. Use of voice, sound tone, etc.
- G. Use of numbers, calculations, logic, classification, critical thinking
- H. Use of interpersonal skills engaging students in collaborative learning
- I. Use of intrapersonal skills, revealing self to encourage students to connect learning with past experiences, memories, introspection.

IV. Course Administration
- A. Registration
- B. Facilities
- C. Audiovisual Equipment
- D. Laser Equipment and Accessories
- E. Faculty and Sponsorship
- F. Course Schedule and Elements
- G. Recordkeeping

V. Conclusion
- A. Examination of knowledge of subject matter
- B. Examination of teaching
- C. Course evaluation
- D. Certification

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References

1. H. Albrecht, W. Wasche. "Evaluation of potential health hazards caused by laser and rf-surgery." *Laser-Tissue Interaction and Tissue Optics*, H.J. Albecht, G.P. Delacretaz, T.H. Meier, R.W. Steiner, L.O. Svaasand, ed. Proc. SPIE 2624, pp. 200-205, SPIE – The International Society for Optical Engineering, Bellingham, WA, 1995.
2. American Association of Dental Schools, "Curriculum Guidelines," *J. Dent. Educ.* **56**, pp. 409-414, 1992.
3. American Society for Laser Medicine and Surgery, Inc. Wausau, Wisconsin. http://www.aslms.org
   - *ASLMS Guidelines for Office-Based Laser Procedures*. April 3, 1998.
   - *Educational Recommendations for Laser Use by Non-Physicians*. April 3, 1998.
   - Lanzaframe, RJ. Smoking "Guns". (An editorial on the hazards of vaporized tissue plume in the operating room environment). April 3, 1997.
   - *Principles for Non-Physician Laser Use*. April 3, 1998.
   - *Standards of Perioperative Clinical Practice in Laser Medicine and Surgery*. October 7, 1994.
   - *Standards of Training for Physicians for the Use of Lasers in Medicine and Surgery*. April 3, 1998.
   - *Suggested Outline for Specific Laser Courses*. April 3, 1998.
4. A.K. Furr, ed. *CRC Handbook of Laboratory Safety*. (3rd ed.), CRC Press, Inc., Boca Raton, Florida, 1991. ISBN 0-8493-0353-2.
5. International Commission on Non-Ionizing Radiation Protection, "Guidelines on limits of exposure to laser radiation of wavelengths between 180 nm and 1,000 :m," *Health Phys.* **71**, pp. 804-819, 1996.
6. Laser Institute of America. Orlando, FL. http://www.laserinstitute.org
   - *American National Standard for Safe Use of Lasers*. ANSI Z136.1-1993.
   - *American National Standard for the Safe Use of Lasers in Health Care Facilities*. ANSI Z136.3-1996.
   - K. Ball. *Lasers: The Perioperative Challenge*. (2nd ed.) 1995.
   - *LIA Guide to Medical Laser Safety*. 1997.
   - *LIA Laser Safety Information Bulletin.*
   - *Medical Laser Safety Reference Guide*. 1993.
   - *Reporting Requirements for Medical Laser Devices*. 1996.
   - D.H. Sliney, ed. *Guide for the Selection of Laser Eye Protection* (4th ed.) 1996.
   - J.F. Smith , ed. *Laser Safety Guide*. (9th ed.) Orlando, Florida: Laser Institute of America, 1995.
   - U.S. Dept of Labor. Occupational Safety and Health Administration. *Guidelines for Laser Safety and Hazard Assessment*. OSHA Instruction PUB 8-1.7. Washington, D.C., August 5, 1991.
7. W.J. Marshall, "Understanding laser hazard evaluation," *J. Laser Appl.*, 7, pp. 99-105, 1995.
8. Office of the Federal Register. National Archives and Records Administration. 1993. *Code of Federal Regulations. Food and Drugs. 21. Parts 800 to 1299*. Washington, D.C.: U.S. Government Printing Office.
9. K. Robinson, "Laser safety: Powerful tools need powerful protection," *Photonics Spectra*, **32**, pp. 92-94, 96-97, 99-100, 1998.
10. D.H. Sliney, "Laser safety," *Lasers Surg Med*, **16**, pp. 215-225, 1995.
11. D.H. Sliney, T.N. Clapham, "Safety of medical excimer lasers with an emphasis on compressed gases," *J. Laser Appl.*, **3**, pp.59-62, 1991.
12. D.H. Sliney, S.L. Trokel, *Medical Lasers and Their Safe Use*, Springer-Verlag, New York, 1993. ISBN 0-387-97856-9.
13. G.L. Smokla, R.P. Jones. "Medical lasers can work wonders – But they must be used with care," *Biophotonics Int.*, **2**, pp. 424-444, 446, 448, 1995.
14. A.G. Varanelli, "Electrical hazards associated with lasers," *J. Laser Appl.*, 7, pp. 62-64, 1995.
15. White JM, et al. Curriculum guidelines and standards for dental lasers education. In: Gal D, O'Brien SJ, Vangsness CT, White JM, Wigdor HA, ed. *Lasers in Orthopedic, Dental, and Veterinary Medicine II*, Los Angeles, Proc. SPIE 1880. SPIE – The International Society for Optical Engineering, Bellingham, WA, 1993:88-98.
16. Winburn DC. Practical Laser Safety. Vol. 11 of *Occupational Safety and Health*. New York: Marcel Dekker, Inc., 1985. ISBN 0-8247-7348-9.
17. Wolbarsht ML. Low-level laser therapy (LLLT) and safety considerations. *J Laser Appl* 1994;6(3):170-172.

Endorsing the Revised Curriculum Guidelines and Standards for Dental Education

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Academy of Laser Dentistry - Japan
Brazilian Association of Laser Dentistry
British Dental Laser Association (BDLA)
Czech Rep. Institute of Dental Research
Czech Technical University, FNSPI, Prague
German Academy of Laser Dentistry
Institut fur Lasertechnologien
Lasers in Dentistry - SPIE
University of California, San Francisco School of Dentistry
University of Sao Paulo, Brazil

Endorsement Signatures for the 1993 Curriculum Guidelines and Standards for Dental Laser Education

Academy of Laser Dentistry
Academy of Oral Dynamics
Alabama Department of Public Health
ALASE
American Academy of Oral Pathology
American Board of Periodontology
American Dental Laser
American Society of Dentistry for Children
Arlington Implant Institute
Australian Society of Laser Dentistry
Australian Society of Laser Dentistry
Baylor College of Dentistry
Beckman Laser Institute, UCI
British Dental Association
Bureau of Dental Health, Texas Department of Health
Bureau of Health Services, Kentucky
Columbia University School of Dental and Oral Surgery
Corbeel Medical, Belgium
Dental Association of South Africa
Dental Institute, University of Zurich
Dental Society of the State of New York
Department of Health and Social Sciences, Wyoming
Deutsche Gesellschaft für Laserzahnheilkunde
Division of Dental Health, Hawaii Department of Health
Division of Dental Health, Indiana State Board of Health
Division of Pediatric Dentistry, UCSF
Division of Public Health Dentistry,
West Virginia State Health Dept.
General Practice, University of Washington
Greater N.Y. Academy of Laser Dentistry Journal
Hispanic Dental Association, Chicago
Howard University College of Dentistry
Incisive Technologies
Indiana University School of Dentistry
Institute for Laser Dentistry
International Academy of Laser Dentistry
International Association of EAV
International College of Dentists
Jamaica Hospital, NYC
Japan Dental Association
Kansas Dental Board
Laser Dentistry, Booth Memorial Medical Center, New York
Laserdent Technologies
Line Lite Laser Corp.
Litton Laser Systems
Marquette University School of Dentistry
Medical University of South Carolina
MedLas Medical Lasersystems
Metropolitan Academy of Laser Dentistry
Michigan Head and Neck Institute
Mid-Atlantic Dental Laser Study Club
MPS, Dentist and Manger Laser Technologie
National Dental Hygienists Association
Nebraska Department of Health, Division of Dental Health
Nevada Dental Association
Nevada State Board of Dental Examiners
New Jersey Dental School, University of Medicine and Dentistry of N
North American Academy of Laser Dentistry
Northeast Regional Board of Dental Examiners, Inc.
Norwegian Dental Association
Office of Dental Health, Arizona Department of Health Services
Office of Device Evaluation, Food and Drug Administration
Ohio State University
Oregon Health Sciences University
Omicron Kappa Upsilon
Oral Medicine, UCSF
Philippine Dental Association
Pierre Fauchard Academy
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South Dakota Dental Association
Southwest Institute of Laser Dentistry
Springtown Dental Office
The Laser Center, The Camilo Castelo Branco University
The London Hospital Medical College
The University of Western Ontario, Faculty of Dentistry
UCSF School of Dentistry
University of Aachen, RWTH
University of Alberta, Faculty of Dentistry
University of Detroit, Mercy, School of Dentistry
University of Florida College of Dentistry
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