

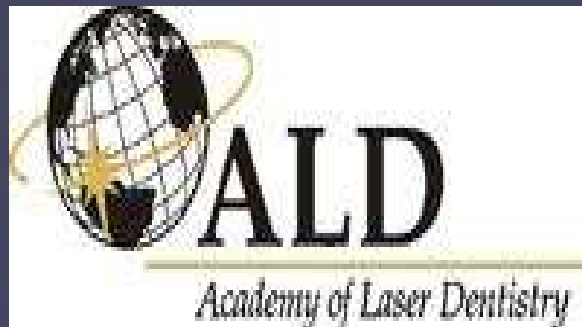
Diode Lasers In the Hygiene Operatory



Heidi Christopher RDH, FWCLI

My Laser Education

- 6 Standard Proficiency Certificates
- Advanced Laser Periodontal Certificate
- Full Fellowship from WCLI



CDA Journal – January 2017

“Benefits of using Lasers in Dental Treatments Validated”

Journal

CALIFORNIA DENTAL ASSOCIATION

January 2017
Historical Women
Women in Dental Education
Gender Demographics



**WOMEN:
THE
CHANGING
FACE OF
DENTISTRY**

Debra S. Freese, RDH, MS, DDS, and Cindy Lynn, RDH, DDS, SCD

Benefits of Using Lasers in Dental Treatment Validated

The benefits of using lasers for dental problems have been validated by a new study conducted by researchers at the New York Institute of Technology. The objective of the study was to “define the laser parameters that optimize pathogen destruction and depth of the bactericidal effect.” The study, using computer simulators, found that diode lasers can kill off bacteria buried 3 mm in the soft tissue of gums. In addition, the lasers limited the amount of heating of the tissue around the gum, which helps the area heal more quickly. Three different types of lasers were utilized and two types of bacteria colonies were studied.

Lou Reinisch, PhD, is associate provost for academic affairs at New York Institute of Technology and co-author of the study. “The findings are important because it opens up the possibility of tweaking the wavelength, power and pulse duration to be the most effective for killing bacteria,” Reinisch said. “The doctors will look at this and say, ‘I see there is a possible benefit for my patients in using the laser.’”

David Harris is also a co-author of the study and director of Bio-Medical Consultants Inc., which specializes in medical laser product development. “When you do this treatment, you remove an infection and allow tissue to regenerate. Getting rid of the infection means the tissue can heal without interference,” Harris said. “The model is a great tool for making predictions of what can happen in the tissue. Our study confirms its use as a way to determine the most effective laser parameters to use clinically.”

Harris also noted that at least 25 percent of dental offices in the United States have the capability of utilizing lasers for periodontal treatment in accordance with their study. The authors suspect that physicians and surgeons will benefit from the research as well for procedures on vocal cords and dermatological treatments. The study, published in *Lasers in Surgery and Medicine*, includes video of the computer simulations where readers are able to view the soft tissue heat up and cool off.

For more information on the study, view the abstract at onlinelibrary.wiley.com.



Cylindrical geometry of the periodontal ligament. (Image: Lou Reinisch/NYIT)

Those Who Get Migraines More Likely to Have Nitrate-Reducing Microbes in Mouth

Those who suffer from migraines are more likely to have a mouth full of more microbes with the ability to modify nitrates than those who don't get migraines, according to a University of California San Diego School of Medicine study published by *mSystems*. Researchers studied 172 oral samples and 1,996 fecal samples. The abundance of genes that encode nitrate, nitrite and nitric oxide-related enzymes in the oral samples appeared more frequently in those who experience migraines. Researchers “used a bioinformatic tool called PICRUSt to analyze which genes were likely to be present in the two different sets of samples, given the bacterial species present.”

Embrillette Hyde, PhD, was one of the researchers. “We know for a fact that nitrate-reducing bacteria are found in the oral cavity,” Hyde said. “We definitely think this pathway is advantageous to cardiovascular health. We now also have a potential connection to migraines, though it remains to be seen whether these bacteria are a cause or result of migraines or are indirectly linked in some other way.”

Next steps for the researchers are to identify more defined test subjects and whittle down the types of migraines experienced. This will allow them to “determine if their oral microbes really do express those nitrate-reducing genes, measure their levels of circulating nitric oxide and see how they correlate with migraine status.”

Many of the 38 million people in the U.S. who experience migraines report a connection between consuming nitrates and bad headaches, according to a news release.

For more information, view the study's abstract at mSystems.asm.org.



What is laser energy

What types of lasers are used in dentistry

Which lasers are best for your practice needs

When & why would you add laser as an adjunct in hygiene

Today's Agenda

What is LASER?

Light

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graph TD; A[Light] --> B[Amplification by]; B --> C[Stimulated]; C --> D[Emission of]; D --> E[Radiation];
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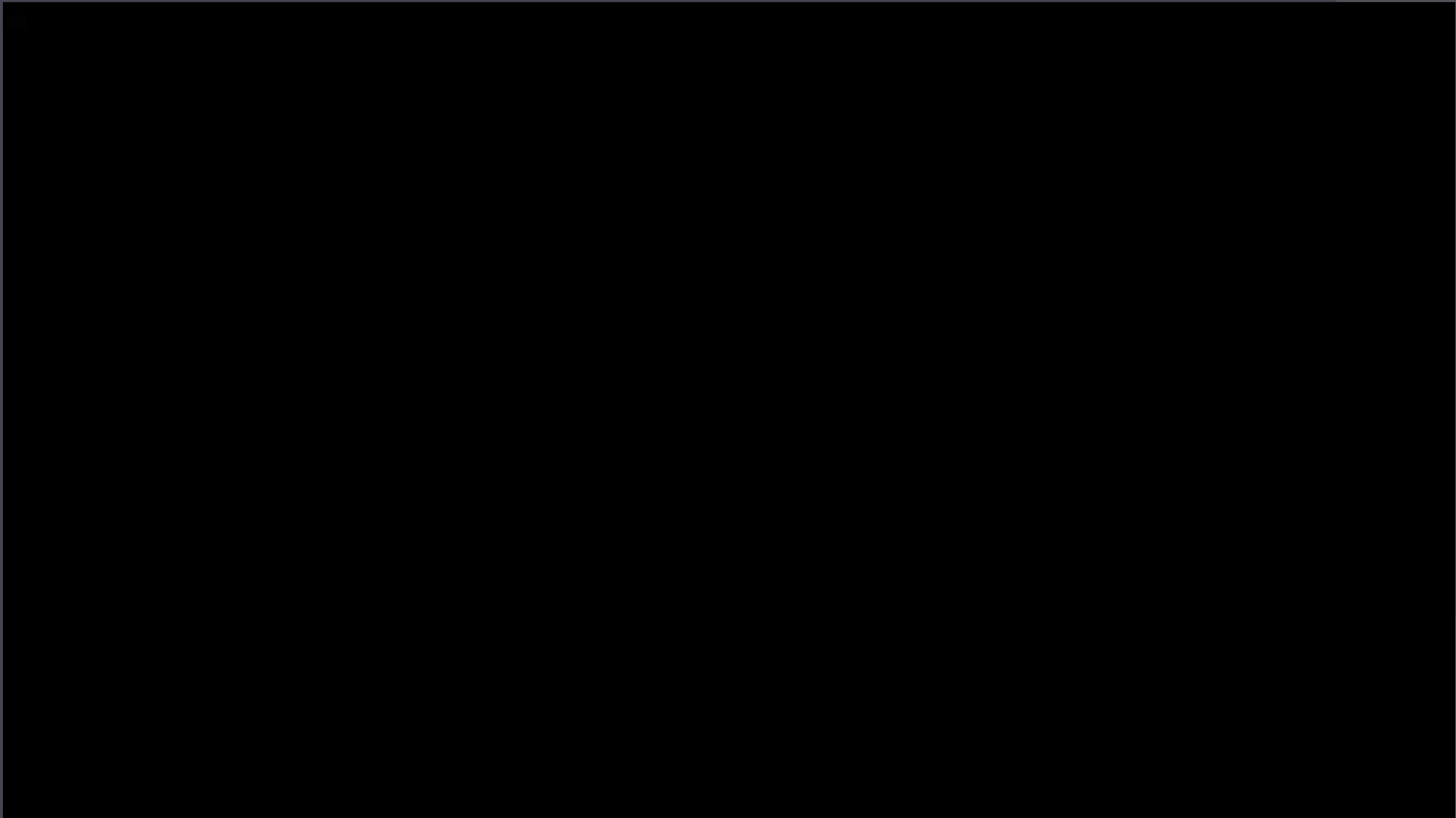
Amplification by

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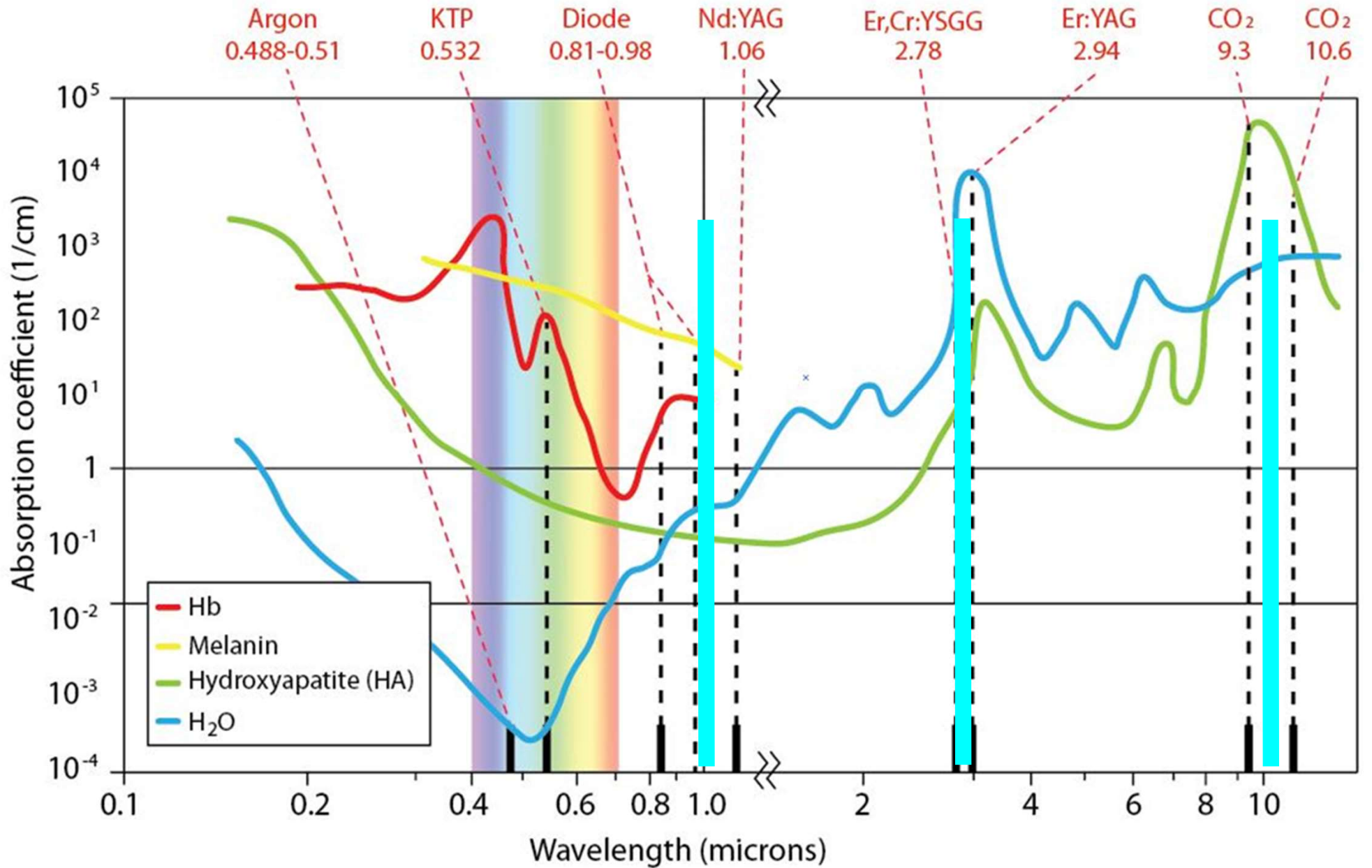
Radiation

Laser Physics



Many Types of Dental Lasers

Absorption curves of various tissue components.



Courtesy of Nick Hartman - Solea Lasers

Approximate Absorption Curves

<u>Medium</u>	<u>Wavelength</u>	<u>Absorbed by</u>
Class 3B lasers	400 – 700 nm	Hgb, Melanin, Resin
Diode (Solid)	800-1064 nm	Melanin, Hgb
Nd:YAG (Solid)	1064 nm	Melanin, Hgb
Erbium (Solid)	2790-2940 nm	Water, Hydroxyapatite
CO (Gas)	9600-10600 nm	Hydroxyapatite, Water

Erbium & CO₂



CO₂ – Cavity Prep



ErCrYSGG: Deep Pocket Therapy



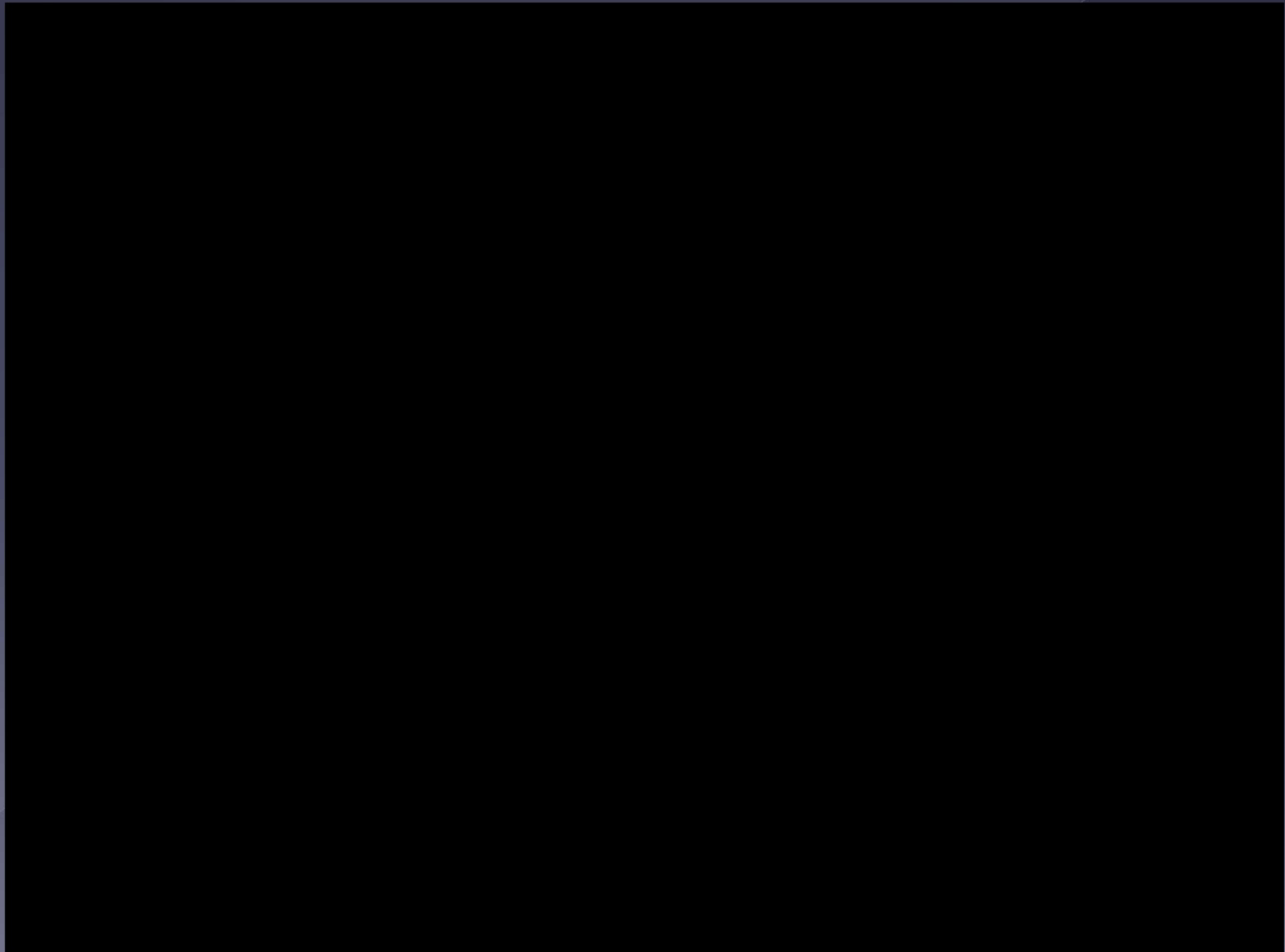
Diodes



DDS Procedures

- Gingivectomy
- Frenectomy - Tongue Tie
- Exposure – Ortho & Implant
- Fibroma Removal
- Crown Lengthening
- Troughing
- Esthetic Contouring
- Etcetera...

Implant Exposure





Gingival Contouring



Courtesy of Dr. Binh Dao



Courtesy of Dr. Binh Dao



Courtesy of Dr. Binh Dao



Dental Team Advancement

Pigmentation Removal



6 months Post-op

Can Your RDH Use a Laser?

Business and Professions CODE SECTION 1900-1966.6

- 1914. A registered dental hygienist may use any material or device approved for use in the performance of a service or procedure within his or her scope of practice under the appropriate level of supervision, **if he or she has the appropriate education, training and experience** to use the material or device.

RDH Procedures

- Laser Periodontal Therapy
 - LBR – Laser Bacterial Reduction
 - LD – Laser Degranulation of diseased epithelium
- Lesion treatments
- Root desensitization

Lesion Treatments

RDH

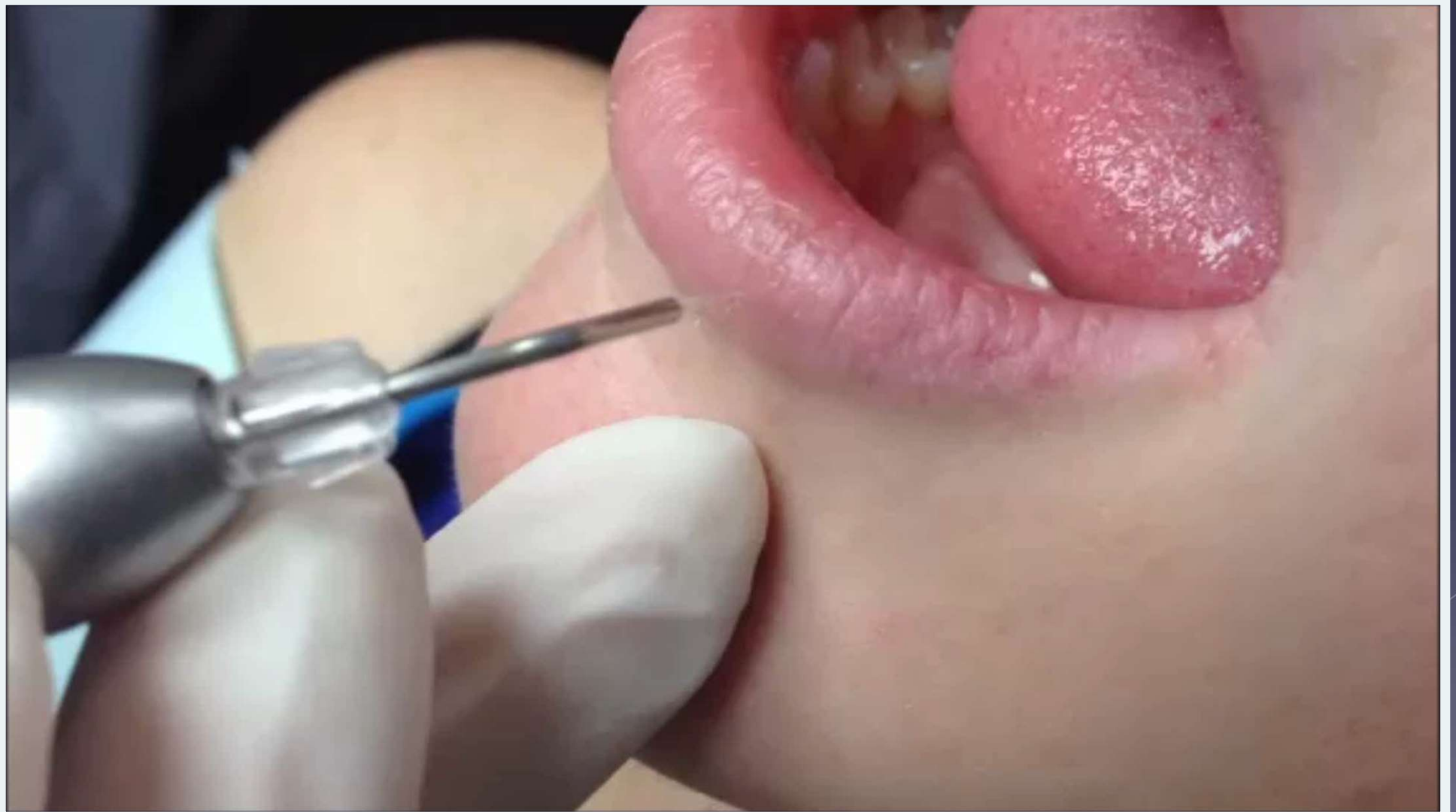
- Aphthous Ulcers
- Herpetic Lesions
- Angular Cheilitis

Lesion Treatments

DDS

- Aphthous Ulcers
- Herpetic Lesions
- Angular Cheilitis
- Denture Sores
- Black Hairy Tongue
- Pemphigoid
- Lichen Planis
- Mucoseal
- Chemotherapy Induced Oral Mucositis

Herpetic Lesion Treatment

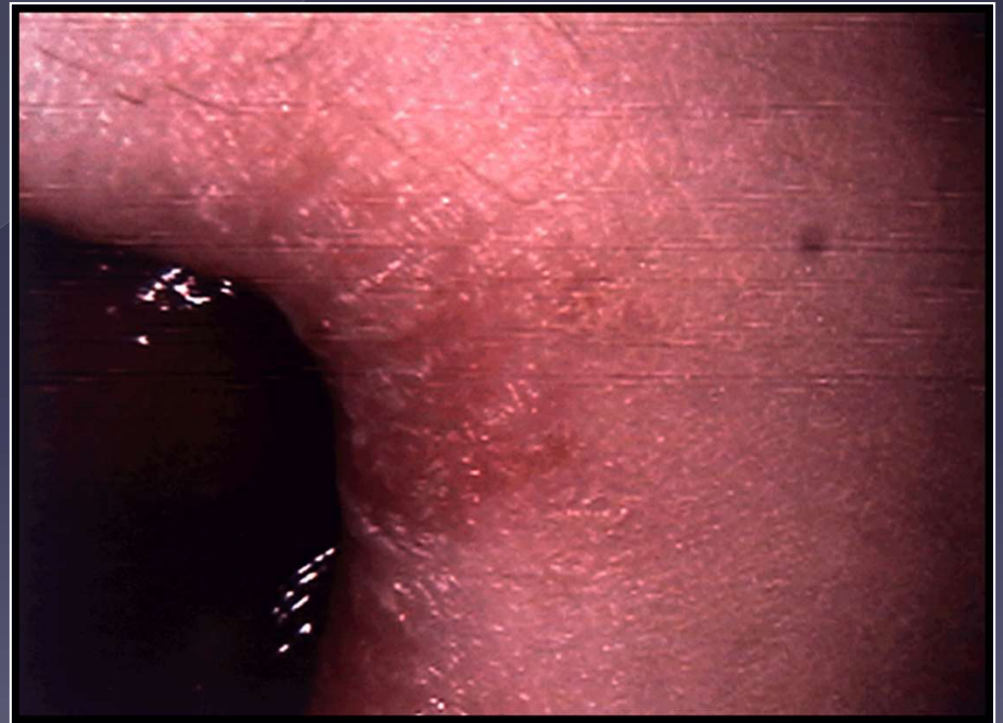
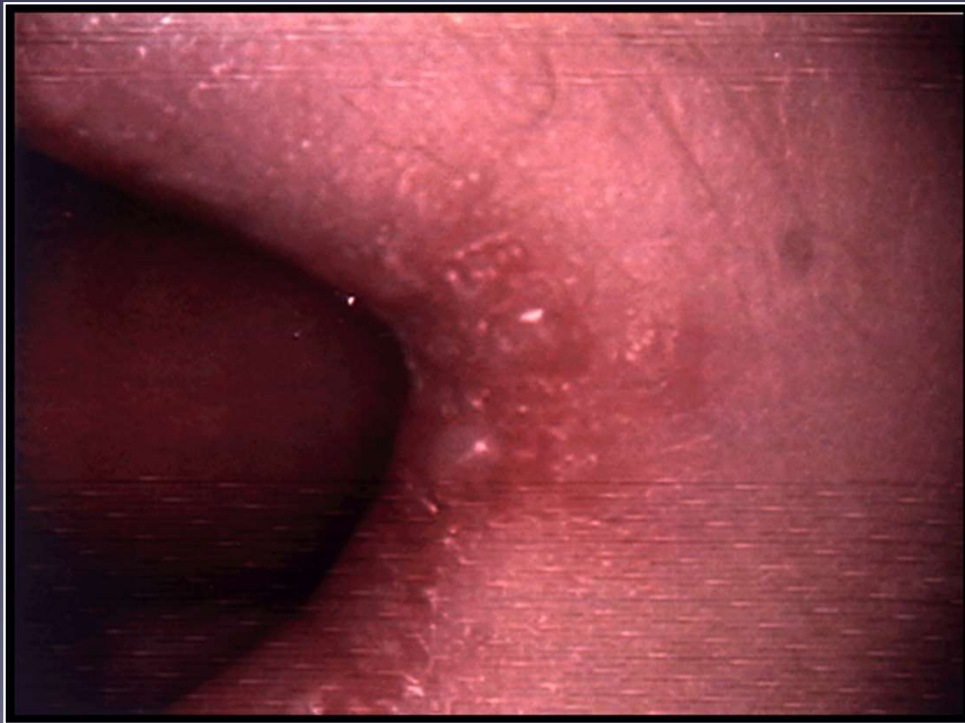


Aphthous Ulcer Treatment



Immediate Post-Op

Herpetic Lesion Treatment



One Day Post-Op



Osteosarcoma, MTX 12g/m², L= 417mm³, P= 4.300mm³

Gr 3 mucositis



L=778, P=22.000mm³

After 4 days
Gr 1 mucositis



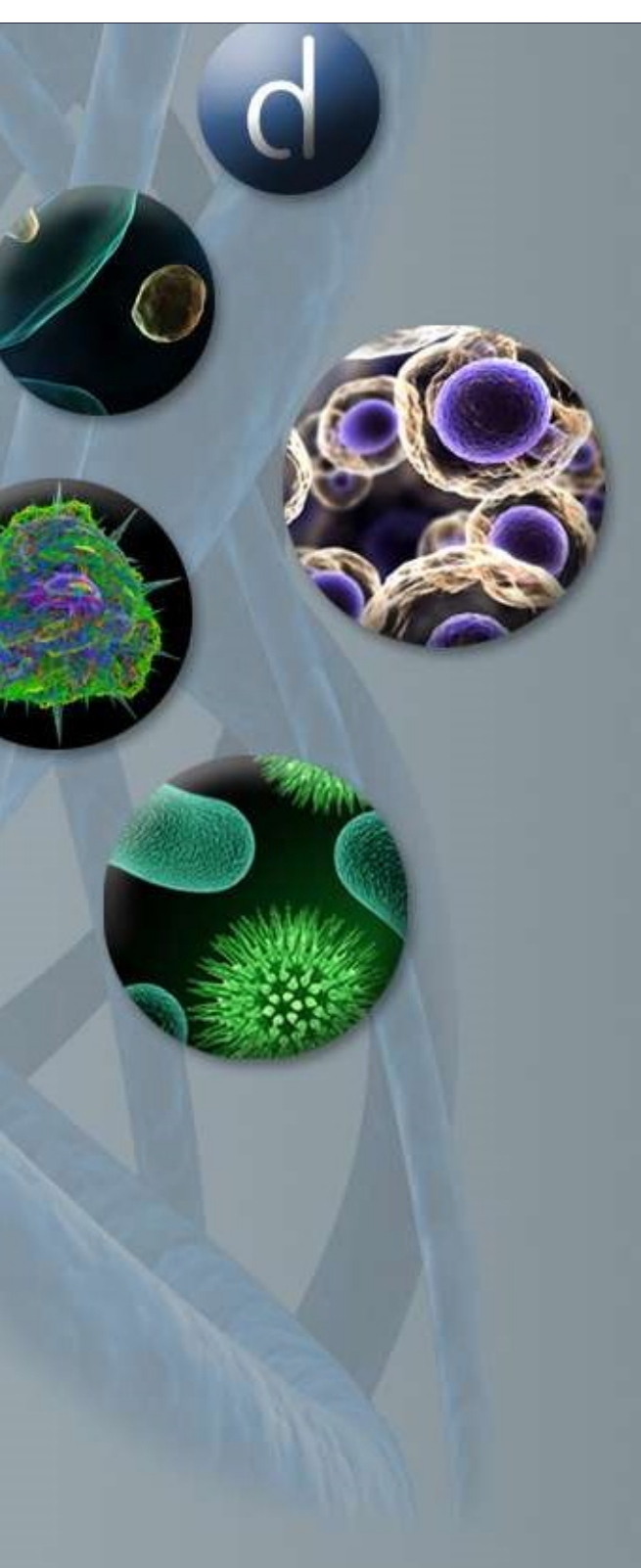
Root Desensitization



Periodontal Therapy

Including Diode Laser Adjunct

- LBR – Laser Bacterial Reduction
- LD – Laser Degranulation of diseased epithelium

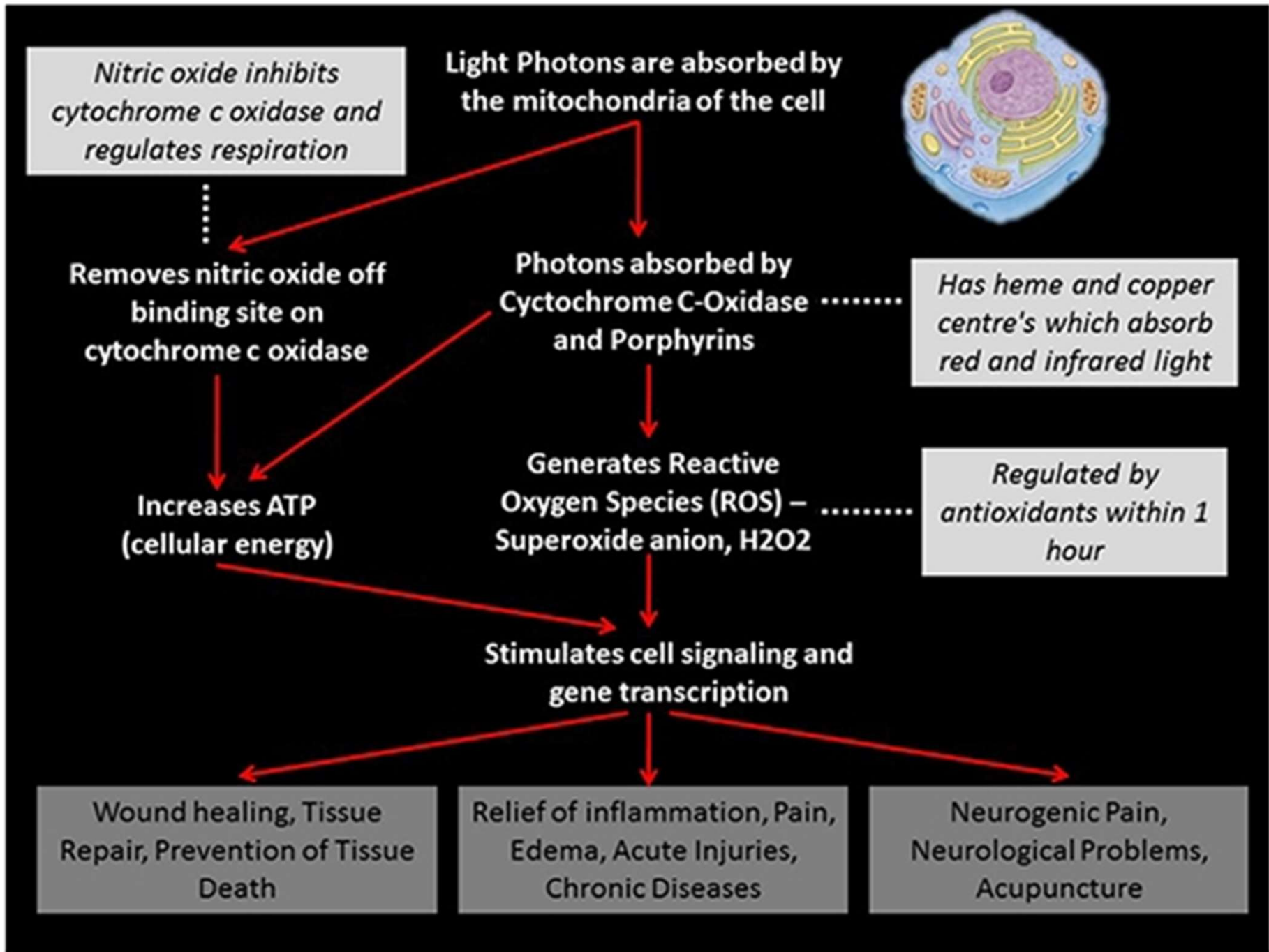


LBR

Laser Bacterial Reduction

AKA:

- Laser Decontamination
- Low Level Laser
- Cool Laser
- Laser Biostimulation
- Photobiomodulation



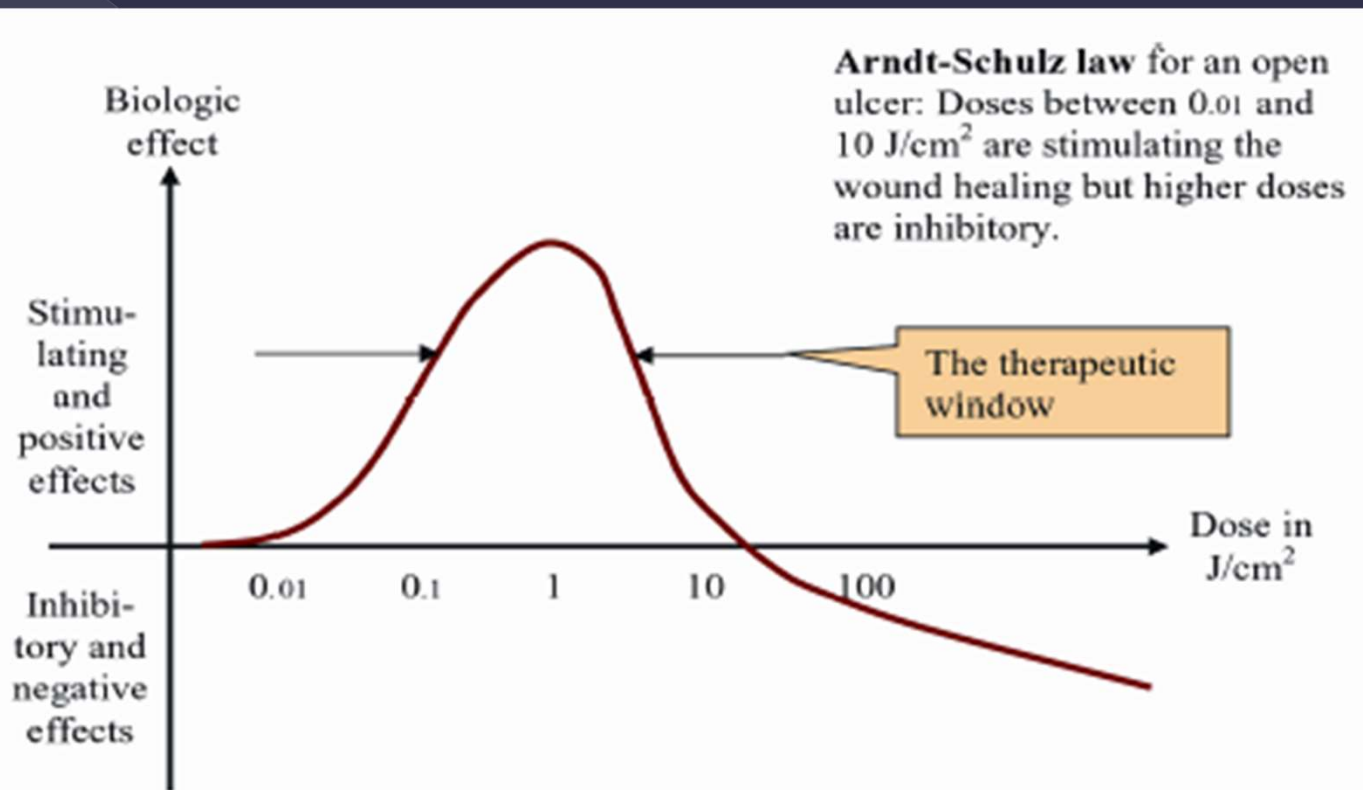
Courtesy of Dr. Gerry Ross

TABLE 1. Secondary Clinical Effects

PBM Result	Clinical Effect
Increased lymphatic flow	Decreased edema (swelling)
Stimulation of β -endorphins (the body's natural pain killers)	Reduction of pain
Reduction in the conduction of c-fibres, which carry pulpal pain	Reduction of pain
Reduction in the release of histamine, bradykinins, and acetylcholine	Reduces the pain associated with inflammation
Stimulation of osteoblasts, odontoblasts and fibroblasts	Stimulate the growth of bone, dentin and soft tissue, respectively
Increased activity of neutrophils and macrophages	Assist in the resolution of inflammation and tissue damage

Courtesy of Dr. Gerry Ross

J/cm²

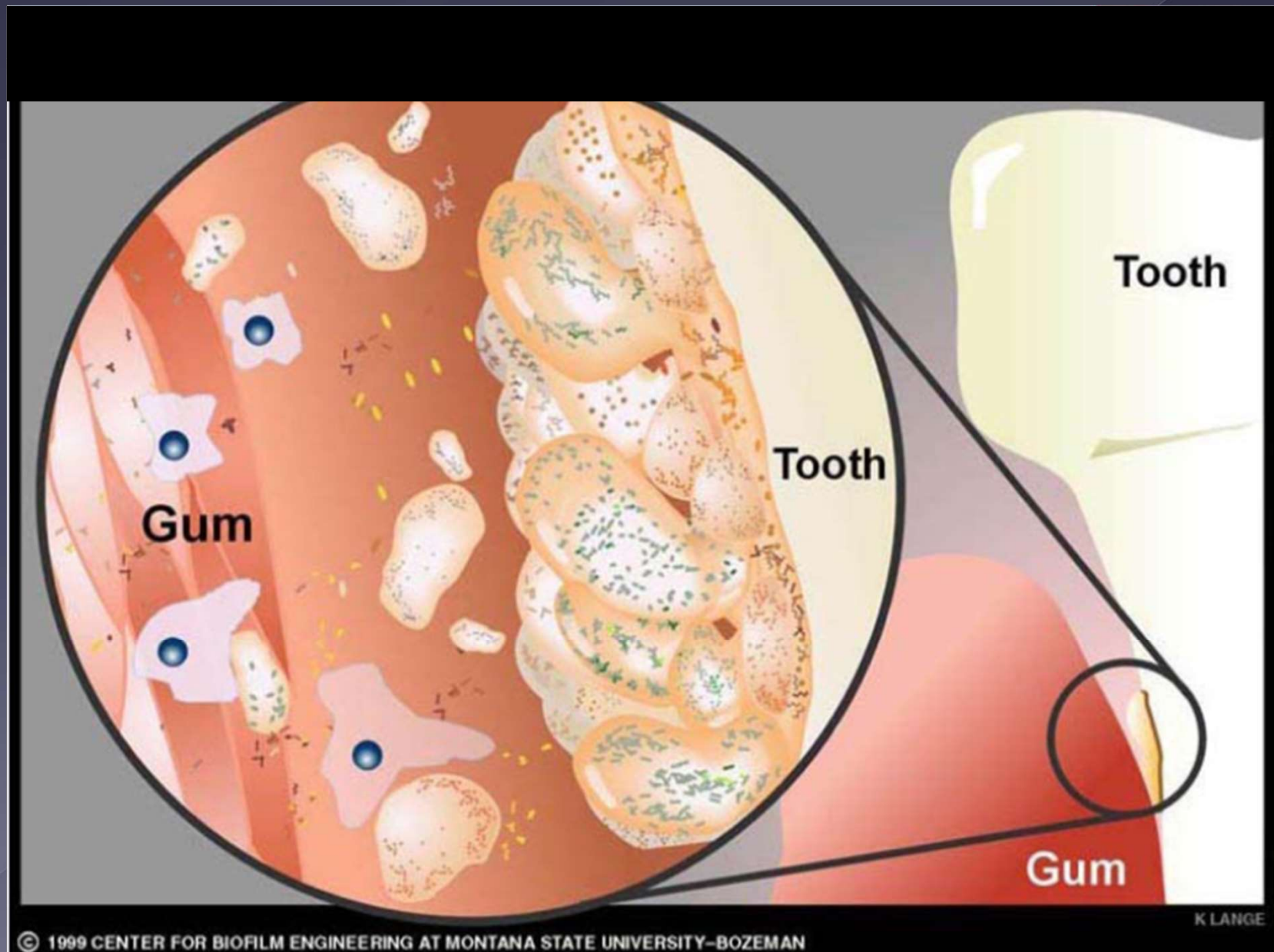


This is a dose (energy density) response curve and there is a similar one for the power density.

LBR Technique



LBR



LBR



Photos courtesy of Hans Schleicher, DDS

36 hours post-op

When would we provide LBR?

- Perio Therapy?
- Maintenance?
- Perio Abscess?
- Prophylaxis?

LD

- Laser Degranulation
- Laser Curettage
- Laser Sulcular Debridement
- LAPT

LD Technique



Before & After



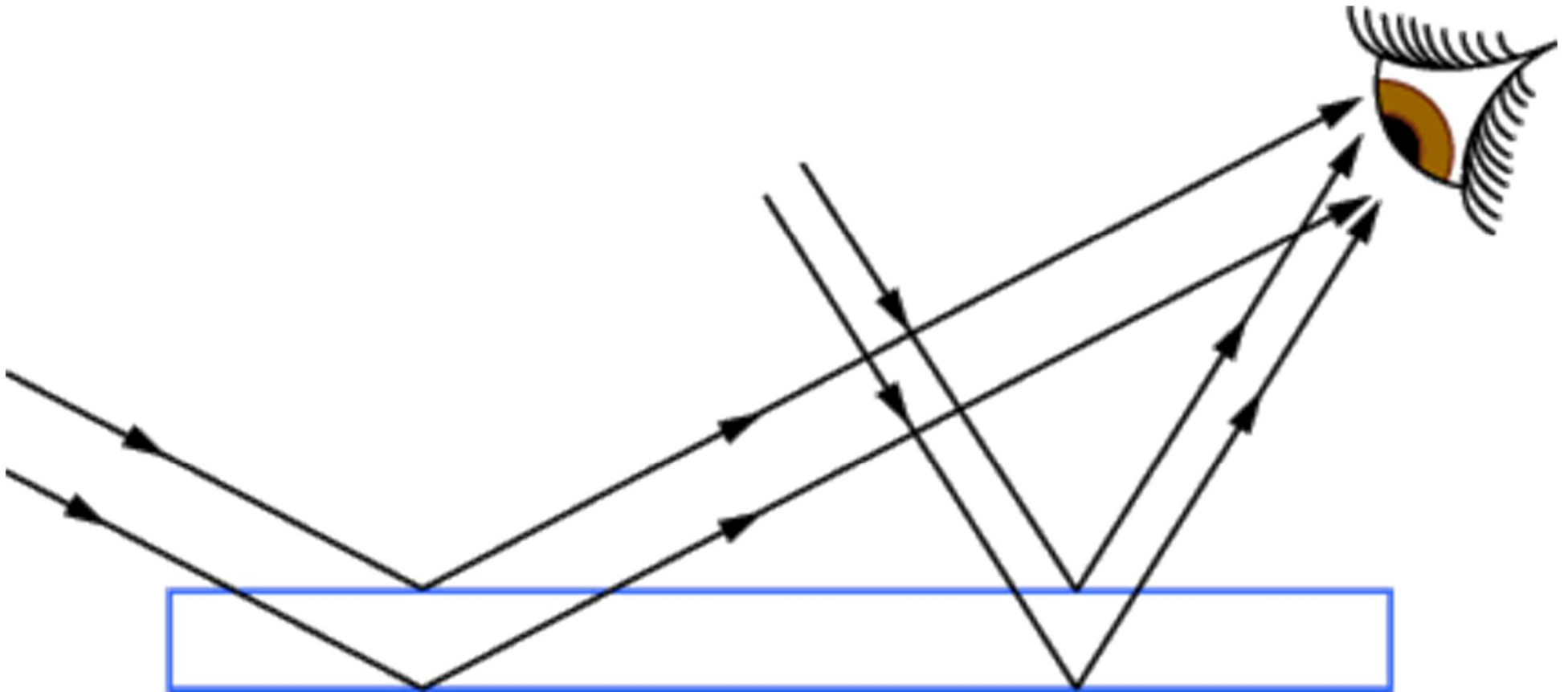
When would we provide LD?

- Perio Therapy?
- Maintenance?
- Perio Abscess?
- Prophylaxis?
- Anytime there is diseased tissue

Laser Safety

- Burn
- Plume
- Sharps
- Eyes
- Flammable

The danger of laser light



Laser Danger





Current Concepts of Laser Therapy

“Incorporating laser therapy on a daily basis offers an endless list of benefits for patients, clinicians and the overall health of the practice

An invaluable and multifaceted tool”

Dr. Gerry Ross

Conclusions

- Diode lasers are a multifaceted tool
- Laser light can be a beneficial adjunct when treating periodontal disease
- Laser can effectively treat many oral lesions
- Treatment protocols are technique sensitive
- Knowledge of treatment parameters and laser-tissue interaction is important
- Understanding Laser Safety Protocols is imperative
- In California, appropriate education and training required for an RDH to use a laser

Resources:

Academy of Laser Dentistry (ALD)

Las Vegas Institute Global

World Clinical Laser Institute (WCLI)

International Center for Laser Education (ICLE)

Loma Linda University School of Dentistry

Ron Kaminer, DDS

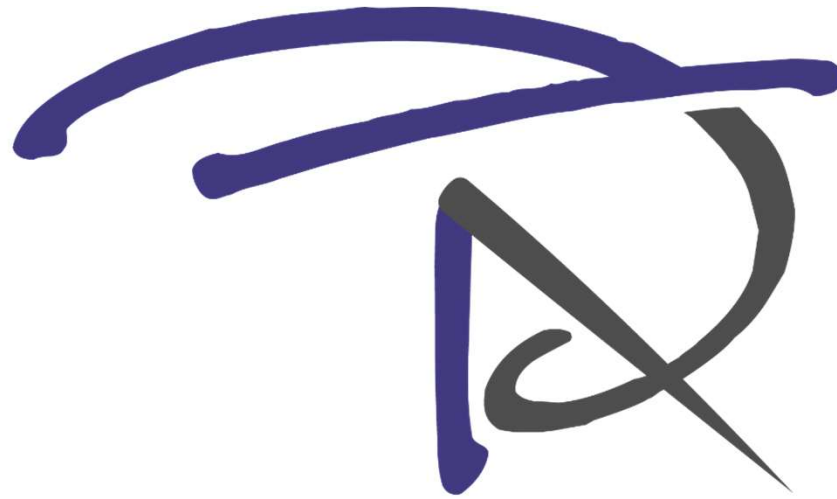
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Dental Team

— Advancement —
elevating dental professionals

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