

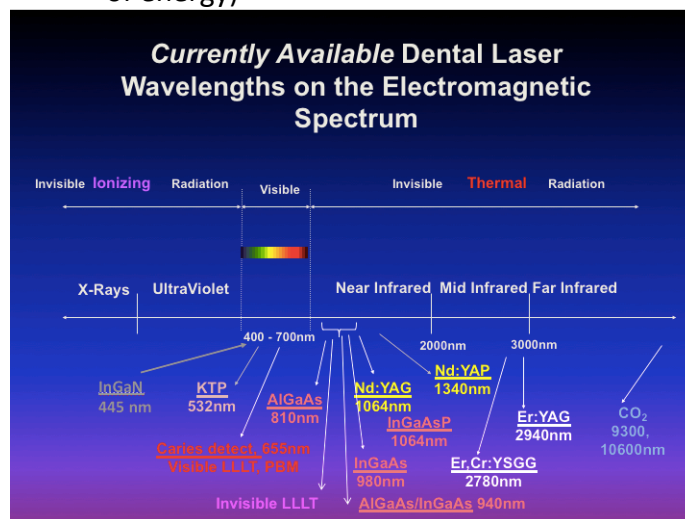
## Diode Soft Tissue Laser Training

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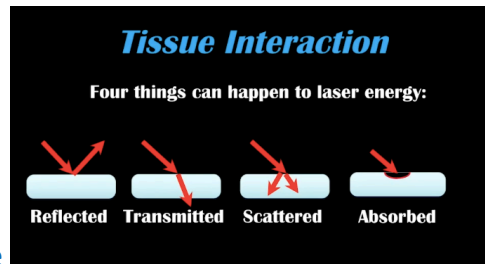
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### Background

- Disclaimer
- Contents: background on lasers and checklist
- Rationale: You should have a basic understanding to provide safe treatment and to be prepared to answer questions your pts may ask.
- Registered Dental Assistant advice: highlighted in YELLOW
- What is a laser?
  - Light Amplification by Stimulated Emission of Radiation
  - Wavelength is the distance from crest to crest, measured in nanometers (nm)
  - Visible light contains many colors, is soft/diffuse/unorganized/incoherent/many different waves/shapes/sizes/not well focused
  - Lasers are in the infrared range of energy. Lasers are not visible, laser is 1 color/organized/coherent/focused
    - Laser exists as a wave, and the light is made up of photon (elemental unit of energy)

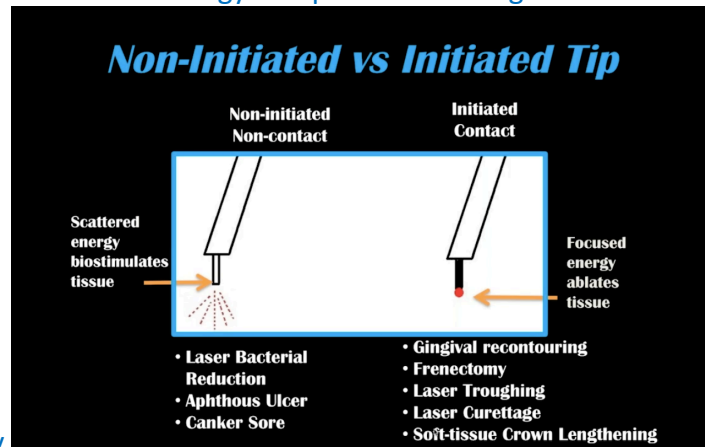


- We cannot see the laser but the "aiming beam" (delivered co-axially along the fiber) lets us see where we are aiming
- The laser is not firing/activated until we step on the foot peddle.
- The way lasers interact with tissue is photo-thermal, meaning, the laser energy is transformed into heat during absorption by the tissue.



○ Laser can be

- Reflected into our eyes
  - Safety. The doctor, assistant, and patient **MUST** wear protective eyewear. Verify the wavelength marked on the laser eyewear matches the laser in use.
  - Clean eyewear with water/soap and dry with a clean soft cloth. **DO NOT** use abrasive chemicals or alcohol.
  - Never point the laser at face, eye, or skin
- Scattered
  - For root desensitizing, aphthous ulcers, herpetic lesions
  - Use a Non-initiated tip = it is not focused but “scattered” to spread energy. Scattered energy “biostimulates” the tissue.
  - Biostimulation allows rapid wound healing, pain relief, increased collagen growth, and anti-inflammatory effect.
- Absorbed by hemoglobin (protein in red blood cells), melanin, and water.
  - For cutting (frenectomy, troughing, soft tissue crown lengthening)
  - Use an Initiated tip = lightly brushing it against articulating paper to FOCUS the energy to a point for cutting **no > 1 second**



▪ Summary

### ***FDA Cleared Applications***

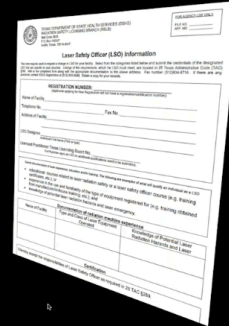
- ✓ Sulcular debridement of diseased fibrous tissue
- ✓ Gingivectomy
- ✓ Gingivoplasty
- ✓ Lesion removal
- ✓ Fibroma removal
- ✓ Tissue retraction (troughing)
- ✓ Aphthous ulcers
- ✓ Gingival hyperplasia
- ✓ Crown lengthening
- ✓ Frenectomy
- ✓ Photocoagulation

- Indications: other indications: operculumectomy, removal of epulis fissuratum, desensitization (off label not FDA approved use, Fluoride, then 0.8 W pulse non-initiated 1 minute), cuspid exposure, implant uncovering, laser assisted periodontal therapy (LAPT), abscess incision, draining and excision, oral papillectomy, pontic formation for bridge, removal of pigmented gingiva, vascular lesion of lip (similar to lingual varicosities), removal of mucocele (grab grape and cut the stem off)
- Safety features: Emergency shut off by:
  - Depress STOP, remove foot from foot switch, press READY (green), turn key counterclockwise (OFF), switch power to OFF
- Panel Buttons
  - **Custom** (programmable favorite setting, which can be done for all) default at Continuous Watt (CW) 1.5 Watts
  - **Debride** default at CW 0.4 Watts
  - **Perio** defaults at Pulse 1.5 Watts
  - **Cut** defaults at CW 1.2 Watts
  - **Stop** – emergency stop
  - **Up/Down**: adjusts by 0.1 Watts
  - **Battery**: Green (100-40%), amber (<40%), red (<20%)(flashes when charging) (same color indications for foot switching)
  - **Display**: laser power level indicator (in Watts)
  - **Up/down**
  - **Ready**: Green circle, toggles between standby and laser ready modes (LED indicator)
  - **Pulse**: Toggles between Continuous Watt (CW) and Pulse modes
    - CW is the default and it is NOT illuminated
    - Pulse mode (illuminated) every 0.05 seconds so 10x/second
  - **Audio**: Toggles between audio on/off
  - **Aiming beam**: adjusts blue aiming beam brightness up and down from A0 to A5
- Back panel:
  - Key switch (safety feature to prevent unauthorized use) and on/off switch

- Do not bend the wire at sharp angle can damage the fiber
- Safety officer-> Not required by dental board of California as states boards don't regulate but OSHA does. Must have written in the OSHA manual the name of the designated Safety Officer and that person makes sure in safe operating conditions, makes sure danger sign is posted indicating the hazard zone and anyone entering must have laser protective eye wear and proper PPE.

### **LSO Registration**

- Some states require the Laser Safety Officer to be registered
  - Texas (required)



### **Laser Safety Officer Duties**

- Education for the dental team on safe use
- Keep everyone clear of Nominal Ocular Hazard Distance (NOHD – found in manual of laser) who does not have proper eyewear
- Enforce all safety practices
- Test firing of laser unit daily
- Setting up standard operating procedures
- Warning signage
- All safety protective wear
- Knows all the OSHA and ANSI regulations
- Recordkeeping for laser unit
  - Log of use
  - Maintenance
  - Calibration
  - Registration

### **Laser Safety Officer / LSO**

- ANSI Z136 standards - Class 4 laser in use requires a laser safety officer (LSO)
- LSO is trained in laser safety and responsible for the laser safety program
- The LSO's is to monitor the control of laser hazards and ensure compliance with ANSI Z136.3
- The LSO is accountable for ensuring that all team members, including front-office staff, have received the recommended training.
- The LSO can be any team member

### **Laser Use and Nitrous Oxide**

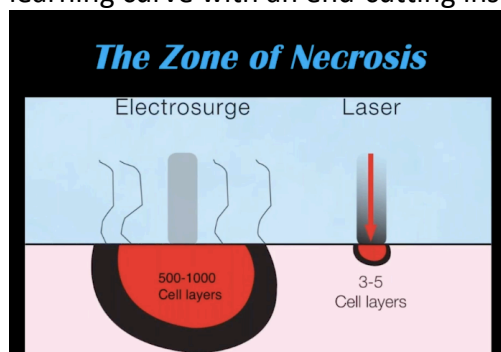
- Nitrous Oxide/Oxygen can be used with proper scavenger and suction techniques
  - ANSI Standard Revision, January 2005

o Laser vs. Scalpel vs. Electrosurge

**Comparison Chart:  
Laser vs Traditional Methods**

Benefits	DenMat Diode Lasers	Scalpel	Electrocautery
Efficient and effective soft-tissue removal	✓	✓	✓
Excellent hemostasis	✓	✗	✓
Safe around implants	✓	✓	✗
Typically requires no topical anesthesia	✓	✗	✗
Reduced post-operative pain	✓	✗	✗
Reduced swelling and discomfort	✓	✗	✗
No periodontal pack or suturing required	✓	✗	✗

- and electrosurge has contraindication (pacemaker), smells bad, less precise
- Diode laser disadvantages: training, cost, eye protection/safety, no single wavelength for all dental diseases, overheating tissue, air embolism, learning curve with an end-cutting instrument



- Traditional Methods - Scalpel**
- Incising with a scalpel leaves open blood vessels and nerve endings on the edges of the wound
  - Blood vessels spill blood into the surgical site, making it difficult to see and requiring sutures
  - Nerve endings spill histamine into the surgical site, causing inflammation and post-operative pain for the patient

- Laser vs Scalpel**
- The laser cuts, coagulates blood vessels, cauterizes nerve endings and sterilizes wound edges
  - Coagulation allows you to work in a dry field, not having to do sutures
  - By cauterizing nerve endings you are stopping histamine release into the surgical site, reducing post-operative pain and inflammation
  - Sterilizing wound edges eliminates the chance of infection

## **Traditional Methods - Electrosurge**

- **Electrosurge requires you to remove all metal and ground the patient**
- **Electrosurge cannot be used around crowns and bridges, implants or dental instruments**
- **Electrosurge causes swelling, post-operative pain and oftentimes recession**

## **The Ultimate Benefit for YOU!**

Procedure	CDT Code	Fee
Gingivectomy – Periodontal	D4211	\$250
Gingivectomy – Restorative	D4212	\$175
Frenectomy	D7960	\$450
Operculectomy	D7971	\$275
Cuspid Exposure	D7280	\$275
Biopsy	D7286	\$250
Laser Bacterial Reduction (LBR)	D4999	\$50
Aphthous Ulcer	D9110	\$50
Destruction of a Lesion	D7465	\$245
Desensitization	D9910	\$50

- CDT codes and D7410 fibroma removal (trauma, cheek biting), D7970 epulis/traumatic fibroma removal, D4212 single tooth gingivectomy (medi-cal may cover if include photo of perio probe showing pocket depth)
- PERIO

## **Periodontal/Hygiene Applications**

**Laser assisted periodontal therapy (LAPT) can be used as an adjunct to traditional scaling and root planing. Laser energy selectively targets only darker, necrotic tissue and leaves healthy tissue alone, allowing for better healing and results. Dental hygienists can also perform other procedures depending on the state law with a non-initiated tip.**

- **Laser Bacterial Reduction**  
Power: 0.4-0.9 watts | Mode: Continuous | Tip: Non-Initiated
- **Sulcular Debridement**  
Power: 0.8 watts | Mode: Continuous | Tip: Initiated
- **Desensitization**  
Power: 0.8 watts | Mode: Pulsed | Tip: Non-Initiated

## ***Laser Bacterial Reduction***

### **Settings:**

**Power: 0.8W – 1.8W**

**Mode: Pulsed**

**Tip: Non-initiated**

### **Benefits:**

- ✓ **Reduces bacteria in pockets**
- ✓ **Reduces risk of bacteria entering blood**
- ✓ **No anesthetic required**
- ✓ **Improves effectiveness of LAPT**
- ✓ **Softens calculus deposits**

## ***Laser Bacterial Reduction Tips***

- **If continuous mode, the setting should be halved:  
0.4W - 0.9W**
- **If pulsed mode, the setting should be doubled:  
0.8W - 1.8W**
- **Higher setting for more advanced periods, lower setting is chosen if gingivitis**
- **LBR is NON-INITIATED**
- **If doing “Sulcular Debridement” after SRP, then initiating the tip can be considered, *if* allowed in the state for hygienist to do**

**Checklist**

- Eyewear on Doc, RDA, and pt
  - o Can inform the patient eyewear is for protection, similar to lead apron for radiographs, or sunblock when in the sun.
- Post laser danger sign (people 6 feet away are safe)
- Set up laser (barrier on handpiece and control panel)
  - o Turn the key to OFF when changing the disposable (sharps) fiber optic tip (each tip good for about 4 teeth)
- Test if the laser is activated on articulating paper
- Apply topical anesthetic
  - o If necessary, use Mepivacaine 3% (so no blanching)
- Determine settings

Indication	Power (Watts)	Continuous or Pulse?	Initiated (wipe on articulating paper) or Non-Initiated?	Defocused? (holding the tip a few mm's away)
Excisions (-ectomies)	1.0	Continuous	Initiated	No
Hemostasis	1.0	Continuous	Non-initiated	Yes
Sulcular Management	0.6	Continuous	Initiated	No
Laser Troughing	1.0	Continuous	Initiated	No
Class V restoration (and implant recovery)	1.2	Continuous	Initiated	No
Gingival recontouring	1.0	Continuous	Initiated	No
Cold sores and canker sores	1.4	Pulse	Non-initiated	Yes
Desensitization	0.8	Pulse	Non-initiated	Yes

- Warn pt may feel “tingling or warm sensation” and “may smell but we will hold the suction next to the area we are working on” (use High Volume Evacuator)
- Provide treatment
  - o Use short brush strokes at the lowest power, if slow and/or too much power = tissue charring/delayed healing, faster is better = less tissue damage faster healing/more precise/narrower
  - o Remember it is END-CUTTING
  - o If excising
    - Make sure the tissue is not too pale. If pale, deposit some pigment on the tip (articulating paper), or mark with prosthodontic marker, or scalpel so it bleeds. If dark pigmentation, reduce power



- To cut deeper, keep going back and forth over the same spot
- If removing a lesion
  - Grasp with hemostat and begin lasing at the base while pulling the lesion, then perform hemostasis
- If excising or sulcular management
  - Wipe the tip often with wet gauze (water not alcohol) to remove debris to prevent overheating. Too much heat damages the tip last 3-4 mm if darken can fracture.
- For sulcular management
  - Short arcs aiming towards the inner epithelial lining of the sulcus starting at the top of the sulcus.
  - Insert the tip 1 mm below the hard tissue margin, if charring of the tissue turn down the wattage. Thermal damage leads to recession.
- For soft tissue crown lengthening
  - Discuss with pt the treatment objective and risks/benefits, risk includes exposure of root surface and sensitivity. (if concerned about root exposure start at most coronal part of gingiva)
  - Measure the pocket depth and outline the design with dots using the laser (0.8 W continuous).
  - Remove the tissue. Caution not to remove tissue beyond the sulcular depth which can invade the biologic width (maintain 2 mm margin to crestal bone)
  - Bevel the tissue with paint brush motion away from the tooth. If not, the tissue regrows unpredictably. Look from the incisal to bevel. If some regrowth go back with laser.
    - \*\*\*case selection. There's a learning curve, start with #3 before tackling #8.
- For apthous ulcers (canker sores) or herpetic lesions (cold sores)
  - Start in the center, bio stimulate within 1 mm of the site, small concentric circles to 2 mm beyond the lesion. Non-initiated, defocused (non-contact) 1.0 W, 2 minutes (>2 minutes diminished returns), can cool with air stream if feels hot. Within 1 day feel better. Can use pulse mode which brings power down 50% takes longer but gives tissue a chance to cool.
  - Will appear desiccated and no more than 2 minutes then you're done.
- Apply Vitamin E oil
- Shut off equipment
- Eyewear off Doc, RDA, and pt
- Post-Operative Instructions
  - Place Vitamin E tonight and tomorrow morning and evening.
  - It will appear red, then whitish, and take 14 days until its completely healed
  - Caution brushing that area the first 3 days, little to no brushing.

□ **Cleaning equipment**

- Hand piece/fiber cord/foot switch use 70/30 isopropyl alcohol
- Eye protection: Water and soap and dry with clean soft cloth

□ **Document**

- Soft Tissue Laser Treatment
- Patient, Assistan, and Dentist all wore eye protection matching the soft tissue laser's wavelength
- Laser: Diode (SOL)
- Wavelength: 800-818 nm
- Operating parameters: \_\_\_\_ Watts, Continuous/Pulse,
- Anesthetic used: none/20% topical benzocaine/Mepivacaine 3%
- Estimated total laser time: \_\_\_\_ Seconds
- Diagnosis/Indication: \_\_\_\_\_
- Description of procedure:
  - Post-operative instructions given
  - Place Vitamin E tonight and tomorrow morning and evening.
  - It will appear red, then whitish, and take 14 days until its completely healed
  - Caution brushing that area the first 3 days, little to no brushing.

References

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