

## Advanced Medical Laser Safety Officer (AMLSO) Workshop

[www.LaserTraining.org](http://www.LaserTraining.org)

04/2024

### **CLASS LIMITED TO 6 PEOPLE**

**Course Prerequisites:** You must meet these to qualify for registration.

- 1) Accredited certificate of formal training as a medical laser safety officer, and/or a nationally recognized CERTIFICATION as a medical laser safety officer (From the NCLC or BLS).
- 2) Additionally, a waiver will be required of each applicant acknowledging their own responsibility in understanding and managing laser hazards and holding harmless the course, Professional Medical Education Association, any faculty, management, and trustees from any potential injury. Regardless, safety issues will be discussed in detail. That's the point of this advanced LSO training.

### **Course Description and Purpose of Advanced MLSO training:**

*How many Medical Laser Safety Officers are out there that have no experience with operating or using a laser?*

Once a MLSO has obtained the required initial LSO training in the theoretical and didactic aspects of maintaining a safe working environment with lasers, they can then benefit by additional practical hands-on experience in this workshop with a wide variety of medical laser systems to become more familiar with the characteristics of the various lasers and their delivery systems, a consideration described in the ANSI Z136.3 standards as important to the LSO in establishing Nominal Hazard Zones (NHZ). Familiarity with the operating characteristics and practical safety considerations of each laser type enhances the MLSO's ability to make "informed judgments" (per ANSI) about laser safety issues. Secondly, the MLSO will learn practical hands-on "inanimate" laser lab exercises that the MLSO may teach to physician staff in their accreditation process to help them become more knowledgeable about the effective control of laser energy with these various lasers and delivery devices, separately from clinical procedure instruction and preceptorships. Such inanimate exercises are generally an initial stage in physician credentialing in many physician credentialing programs. You'll receive a summary of how to set up individual laser stations, including suggested inanimate models to use, for inanimate lab training for physicians, or other laser operators. Your workshop sessions will essentially duplicate this for your hands-on. Regardless, these exercises help the LSO become much more familiar with the characteristics of the lasers which is important for safety considerations.

**For those that do not already hold an NCLC Medical Laser Safety Officer Certification (CLSO/M)** we will offer the Certification review and exam at no additional cost both on the second afternoon of the regular LSO course, and also the day after this Advanced course if you did not attend the entire 3 day program. One can register and attend just the 2 day LSO course, can attend all 3 days to include the Advanced course, or can attend only the third day for the Advanced course IF you meet previous training requirements. Those taking the Certification exam will be setup to take an online practice exam the evening prior to the exam. Bring your laptop or tablet computer. That practice exam self-grades as you go along so it helps prepare for the exam the next day.

**Lasers/Modalities used in the training:** The Advanced Medical Laser Safety Officer workshop may include, but not be limited to, hands-on practice with the following types of lasers/modalities:

1) CO<sub>2</sub> lasers with collimated beams, handpieces, laparoscopes and microscopes with appropriate inanimate models 2) CW Nd:Yag lasers to show fiber control and tissue effects 3) Ho:Yag lasers (same as Thulium) used with models to teach coordination in stone fragmentation and effects in bone ablation, and review of the actual measurements of the NHZ for these lasers 4) KTP lasers used on appropriate inanimate models 5) Ophthalmic Q-Switch NdYag lasers for photodisruption 6) Q-Switched Tattoo removal lasers including Nd:Yag, KTP and/or Ruby on appropriate models 7) Airway laser safety practice and demonstrations including creating live airway fires (inanimate model) and management steps taken in these emergencies 8) Practice with coordination of applying aesthetic lasers such as Alexandrite or Nd:Yag and special safety precautions taken around the bony orbit of the eye.

### **Summary of Workshop Lab Exercises (Third day which is the Advanced Course Day)**

**8am – 5pm 7:45am -**

**Coffee, sign-in**

8:00 – 8:15am – Introduction to the 1 day workshop, and determination of who will be staying for the NCLC MLSO Certification review and exam the next day. (You do not need to stay if you were here for the first two days and took it then)

**LUNCH** will be catered in

5:00pm – Adjourn for the day. Time approximate depending on progress in the lab stations.

**THE OBJECTIVE** of these hands-on stations is to dispel some of the mystery and fear of actual laser hazards for Laser Safety Officers, and to enhance their familiarity with these characteristics and effects of the lasers in a variety of situations. This enhanced practical knowledge as a laser operator and user makes the LSO more familiar with potential laser hazards and where the risks may be restricted or eliminated. The ANSI standards state that different delivery systems each have their own hazard zones and that the LSO should be familiar with these. **ANSI Standards also recommend that LSO's have some practical experience first as laser operators, and these exercises help fulfill this intent.**

Exercises practiced and characteristics demonstrated will include:

**1) CO<sub>2</sub> Laser stations** - General, not Airway Fire - Fire the laser on inanimate targets such as apples, grocery store chicken, tongue blades and similar targets using a variety of delivery systems including the handpieces, micromanipulators and CO<sub>2</sub> laser laparoscopes. Demonstrate the varying focal lengths, divergence and "burn zone" for each delivery system. Show the use of the collimated beam by itself in creating burns at a distance. Let each person feel the laser beam at "safe" distances, demonstrating distances where discomfort (not pain nor burns) occurs with the different delivery systems. Reinforce fact that if it won't burn your skin then it won't burn your eye. Using delivery devices, dissect pieces of chicken or hot dogs. Use through the micromanipulator in colposcopy models to vaporize pieces of potato. Show use through laser laparoscope. Demonstrate the technique of controlling power density with spot size showing shapes of impact from sharp to rounded bottom vaporization to create

controlled scoop-like vaporizations at varying powers with different spots - using apples to show "clean" vaporization with only slight charring on the edges. Show the differences with superpulse modes. Using high % alcohol or acetone show that the CO<sub>2</sub> laser will NOT ignite the liquids in a container at any time. Show the same thing with 4x4 sponges wetted with the same, but then showing what happens when a dry portion is ignited by laser and the flame spreads quickly over the flammable liquid-soaked area.

**2) CW Nd:Yag Laser Station** - Fire the laser on inanimate targets such as grocery store chicken, liver, tongue blades with black marks on it, and similar targets using air cooled transmitting fibers and bare transmitting fibers used in a glass of water to cool. Demonstrate the diverging beam and how quickly power density drops with distance from fiber tip. Let each person feel the laser beam at "safe" distances, demonstrating distances where discomfort (not pain nor burns) occurs with the transmitting fiber, but reinforce fact that if it can still burn your retina because it transmits into eye. Using both bare fibers and contact tips to dissect pieces of chicken and show coagulation in liver. Demonstrate "dark selectivity" by showing selecting burning on tongue blade with black marker stripes on it, and on a white Styrofoam cup with the black marker on one side but shooting from the other.

**3) KTP Laser Station** - Use the laser with bare transmitting fiber (no fiber catheter) in ways like demonstrating the Nd:Yag laser. Show the visible light on the wall or ceiling using no eyewear, and discuss safety implications, including that of aversion response. Use laser through Endostats or metal suckers and show coagulation and incision of tissue using liver and chicken. Demonstrate color (dark) selectivity of light. Use strips of raw fish with red vascular areas to show absorption. Discuss use through micromanipulators. Differentiate potential hazards of low power KTP units, vs the 180+ watt urology units.

**4) Ho:Yag Laser Station** – Discuss that Holmium and Thulium Yag lasers are essentially the same and present the same types of hazards and safety. Show use of pulsed laser effects on various materials both under fluid and in air. Show and discuss the delicate nature of the very small Ho:Yag fibers. Demonstrate breakage of the fibers while firing the laser and discuss fire hazards in a surgical field. Demonstrate how a Ho fiber "cleans" itself off after burning and then continued firing. Show the relative NHZ of the Ho fibers by shooting on the skin (safely) at a short distance (i.e. 1 ft). Demonstrate effects of higher energy and lower pps (pulses per second) vs lower energy and higher pps settings. Demonstrate fracturing of candy "stones" under fluid and importance of fiber contact with target when using fragmentation (vs dusting).

**5) Q-Sw Ophthalmic Lasers** - Show use for familiarity with setting options, discuss use of slit lamps. - Q-Sw Nd:Yag Laser. Demonstrate control panel operation and choice of settings (pretty basic)

**6) Q-Sw Tattoo Laser (Ruby, Nd:Yag, KTP)** - Demonstrate photoacoustic "snapping" effect of laser on targets and tissue. Show white "snowflake" result on skin on instructors, and optionally on participants at their discretion (brown skin spots - NOT for use on dark brown or black skin). Demonstrate removal of colors on color photographs. Demonstrate removal of colored marks on eggshells.

***This station has MULTIPLE wavelengths, so be sure to be using the CORRECT laser glasses for each wavelength.***

**7) CO<sub>2</sub> Laser AIRWAY FIRES** - Demonstrate actual fires using simulated ET tubes made from PVC plastic in oxygen enriched environment, using CO<sub>2</sub> laser through microscope and micromanipulator. Exercise utmost CAUTION in this exercise. Fire blankets and fire extinguisher will be available. Ignite the ET tube placed in a glass tube container, then "extubate" the tube, disconnect oxygen, and throw the flaming ET

tube into a container of water. These exercises are as much "awareness" of this critical issue, as it is of steps in containing them.

**8) Aesthetic Laser – Alexandrite, Diode or Nd:Yag for hair removal etc.** - This station is intended to provide familiarity with the way aesthetic lasers are used and set in radiant exposures of J/cm<sup>2</sup>. Awareness is brought to the need to develop coordination in overlapping spots consistently, besides treating within protocol guidelines provided by manufacturers. Discussion of increased ocular hazards from collimated handpieces is discussed. We'll practice on "zap-it" paper in plastic bags, and on eggplant skin.

If you've not already taken the exam during the regular LSO course, or are not planning to take it anyway, then you're finished with the course.

### **Day 2 - 8am – 12:30pm**

(Optional for those taking NCLC CLSO/M Exam who were not here the first two days to take it)

**7:45am - Coffee, sign-in**

**8am NCLC MLSO Certification Review & Exam (was also held the 2<sup>nd</sup> day of the regular LSO course)**

For those that do not hold a MLSO Certification, but otherwise qualify, we'll provide these NCLC exams at no additional charge on this second day (\$295 value). You'll complete your application form the morning of testing and can send in any supporting documents after you return home. You'll be setup for an online practice exam in the evening which self corrects as you take it. When we start in the morning, we'll first conduct another intensive review session right before testing. You'll take the exam online with provided tablet devices in a secure, monitored online exam. You'll know immediately when you finish on how you did on the exam, and the system records your score. You'll be finished whenever you're done with the exam. Not everyone will go until 12:30pm – people take different amounts of time for testing.

Workshop held in the classrooms of The Laser Training Institute, Grove City Ohio (Columbus Ohio)  
3142 Broadway, Ste 201, Grove City OH 43123. Info@LaserTraining.org, Tel: 01-614-883-1739,  
<https://lasertraining.org>

Recommended Hotel for class (about 5+ minutes away) **DRURY INN & SUITES, COLUMBUS-GROVE CITY**  
<https://www.druryhotels.com/locations/columbus-oh/drury-inn-and-suites-columbus-grove-city>

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