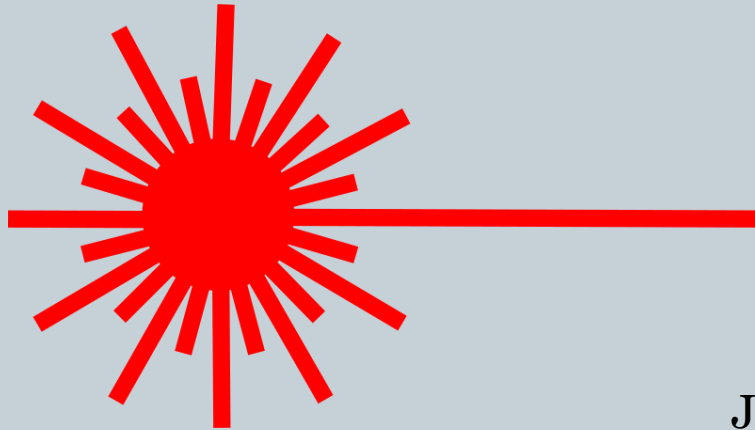


Laser Safety 2021 - Periop



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Laser Safety



- **Objectives**
- Discuss laser safety and safety interventions
- Identify fire hazards
- Identify laser hazards and procedural control measures
- Identify nominal hazard zone (NHZ)

Laser Safety



- Class 4 lasers are used in the health care setting
- Exposure to Class 4 lasers is hazardous to eyes and skin if proper protocol is not followed
- Lasers are a fire risk
- Perioperative personnel are responsible for providing a safe environment for patients and health care workers during the use of laser technology.

Laser Safety - Equipment



- The laser is required to be inspected by the laser operator before use for any damage, including the electrical cord and plug
- Liquids shall not be placed on the laser unit
- Service and preventive maintenance is performed on a regular basis (look for the BioMed sticker)
- The wavelength of the laser is posted on the device and corresponding laser sign



Nominal Hazard Zone (NHZ)

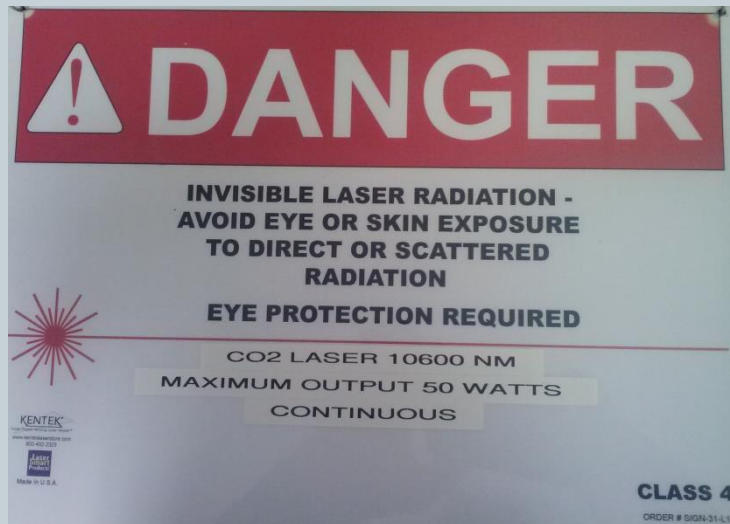


- The entire room in which the laser is used is considered the NHZ (or laser treatment area)
- Safety equipment must be used by all persons in the room
- Approved laser eyewear is required by all persons in the Nominal Hazard Zone
 - Including surgeon and anesthesia
 - If anyone refuses – do not turn the laser on and remove the key
 - ✦ Report the situation to the LSO or manager if you cannot resolve the issue

Laser Treatment Area



- Warning signs are posted to control access and prevent unintentional exposure to the laser beam. (Sign design may vary)
- Doors to the treatment area shall remain closed and windows covered with an approved laser barrier that blocks transmission of a beam.



Laser Treatment Area



- Patients' eyes and eyelids shall be protected from the laser beam
- Laser specific goggles, glasses, and/or wet eye pads
 - ✦ Eyewear must be laser specific and approved
 - ✦ If using wet eye pads, they **MUST** remain moist throughout the entire procedure
- Surgical drapes are **NOT** eye protection for the patient

Laser Wavelengths/Glasses Requirements



The numbers/ranges below **MUST** be listed on the glasses for use with the specific laser. If the numbers are not listed on the glasses, they are **NOT** to be used; use of improper glasses could result in ocular damage.

Laser Specific Eyewear		
CO ₂ Laser	10600 nm	
Holmium Laser	2100 nm	Range for glasses 1000 – 2400 nm
YAG Laser	1064 nm	
Excimer Laser	308 nm	Range for glasses 190 – 398 nm
ND YAG	532 nm	

Laser Treatment Area



- Correct laser wavelength and optical density eye protection is available for all people in the treatment area (wavelength information can be found on the laser, manufacturers operator manual and laser sign)
- Eyewear shall be inspected for damage and scratches before use
- Damaged eyewear shall be removed from use and reported to the LSO (Laser Safety Officer)

- Which pair would you choose for CO₂? For Holmium Yag?



Laser Assistant



- Focus is on the safe control of the laser to prevent accidental activation of the laser beam.
 - ✦ A dedicated laser operator is present in the room and cannot circulate or perform other duties while the laser is turned on or in stand-by mode.
 - ✦ Laser key will not be inserted when laser is not in use. Laser operator is responsible for the laser key at all times.
- Limited access to laser keys, surgeon only foot switch placement, and use of the standby setting are methods of control for laser safety.
- The shut off switch is used to disable the laser in case of component breakdown, fire, or emergency.

Laser assistant



- Procures the laser unit and supplies
- Provides safety equipment for the patient and surgical team
- Prepares the room for laser use
- Conducts a laser test
- At completion of the case, clean and return all equipment, glasses and keys.
- Document in Laser Log in Epic (If laser operator is a CST, the RN circulating nurse will document in Epic the settings and parameters from the CST laser operator)

Laser Safety

- Anodized, dull non-reflective or matte-finished instruments shall be used near the laser site to decrease the reflectivity of laser beams
- Exposed tissue and drapes around the surgical site shall be protected with saline or water saturated towels or sponges

Control of Laser Hazards Protective Equipment



Laser Safety -Plume



- The first line of defense against surgical smoke (plume) is using a smoke evacuation system
- The wand of the smoke evacuation system shall be positioned no greater than 2” from the source of smoke
- High filtration masks shall be used as the second line of defense against airborne particles resulting from laser use

Laser Safety - Fire



- Lasers are a potential ignition source for fires
- Alcohol-based prep solutions are NOT used
- Nonflammable prep agents will minimize the risk of fire
- Sponges and drapes near the surgical site shall be kept moist
- Know the location of the nearest fire extinguisher



Laser Safety - Fire



- During laser procedures involving the patient's airway or aero-digestive tract, laser resistant endotracheal tubes (ETT) should be used to minimize the potential for fire
- The endotracheal tube cuffs should be inflated with normal saline. Methylene blue may be added to the saline to help detect punctures.
- Moistened packs may be placed around the ETT

Laser Safety – Fire



- Discuss with anesthesia provider the possibility of using room air, when possible, instead of O₂
- Tent drapes and place suction under the drapes to prevent the build up of O₂

Laser Safety - Fire



- Airway fires require the following actions:
 - Removing the ETT while disconnecting the breathing circuit
 - Turning off the oxygen
 - Pouring saline into the airway
 - Removing all flammable and burning substances from the airway
 - Re-establishing the airway
 - Bronchoscopy to assess airway damage
 - Performing a tracheostomy if necessary
 - Assessing the patient for follow-up care (ICU)
 - Saving all materials for investigation

Laser Safety - Documentation



- A laser safety checklist shall be used to ensure all safety measures have been implemented
- Documentation of the laser procedure is completed in EPIC
- A paper laser log may be used as an adjunct to the perioperative documentation when EPIC is non operational

Resources



- Laser Safety. *Guidelines for Perioperative Practice, 2021 Edition*. pp. 421-442. Denver: CO, AORN, Inc.
- 2019 (SEH) Perioperative – Laser Operation and Safety. Clinical Skills.

Laser Safety



- We hope that you find this computer-based learning activity helpful in your practice.
- Feel free to review the information in this presentation as necessary before proceeding to the test.

Laser Safety



**You have completed the CBL.
Please proceed to the test**