


Name of Policy:	<u>Operating Room Laser Operation, Safety & Procedures</u>	 Effective Date: 6/1/2022 Initial Effective Date: 6/1990
Policy Number:	3364-124-56	
Department:	Nursing Service/Operating Room	
Approving Officer:	Chief Nursing Officer	
Responsible Agent:	Chief Nursing Officer	
Scope:	Operating Room/Perioperative Services	
<input type="checkbox"/> New policy proposal <input type="checkbox"/> Major revision of existing policy		<input checked="" type="checkbox"/> Minor/technical revision of existing policy <input type="checkbox"/> Reaffirmation of existing policy

(A) Policy Statement

The Operating Room (OR) Laser Team will consist of Registered Nurses (RN) and Surgical Technologists who have received laser training and training specific to the lasers to be operated. Appropriate measures will be followed and maintained to ensure proper use and safety.

(B) Purpose of Policy

To ensure the safety of patients and staff by limiting operation of laser equipment to qualified personnel and to reduce the hazards of laser related safety issues, and to follow fire safety guidelines specific to laser use in the OR.

(C) Procedure

1. A qualified laser operator will complete laser training and demonstrate knowledge of the principles of laser physics, operation, features, safety precautions, fire safety and documentation of competency for specific types of lasers to be operated.
2. Qualified laser team members will take an active role in annual laser safety in-services and fire safety in-services for OR staff.
3. A qualified laser team member will function independently of the circulator.
4. A qualified laser team member will be responsible for:
 - a. posting appropriate warning signs on all OR doors where laser is in use,
 - b. providing appropriate personal protective equipment for patient and staff and monitor their use during the laser procedure,
 - c. calibration and test firing of the laser pre-operatively, when required,
 - d. monitoring adherence to all laser safety policies, procedures, and guidelines established by The University of Toledo (UT) Safety and Health Department and the UT Laser Safety Committee,
 - e. completion of the laser safety checklist,
 - f. immediate reporting of any laser incidents to OR Operations Supervisor and UT Laser Safety Officer. The UT Laser Safety Committee will review all incidents involving lasers.

5. Eye Protection

- During laser procedures the patient's eyes will be protected with moistened gauze pads or appropriate laser protective eye wear (glasses or goggles). Appropriate eye protection will be determined as follows:
 - Laser surgery below the head and neck area - local anesthesia, all lasers:
 - If alert and cooperative, patient may wear appropriate eyewear, provided there is no opening between the goggle and skin surface where laser light may enter. These patients must be instructed in the importance of adherence to safety precautions.
 - Laser surgery below head and neck area - general anesthesia, all lasers:
 - Patient's eyes will be cared for in the usual manner by Anesthesia staff. In addition, one of the following methods of eye protection will be used:
 - Moistened gauze eye pads applied,
 - Eye wear appropriate to wavelength applied, if it does not interfere with anesthesia techniques,
 - Physical barrier, i.e., wet towel placed between laser outlet source and patient's eyes.
 - Laser surgery within the head and neck area - local or general anesthesia, all lasers:
 - Eyes covered with wet gauze eye pads or filtering lenses that correspond to the specific laser wavelength. Eyewear should be placed to prevent entry of laser light,
 - Treatment of the periorbital area that would ordinarily be covered by gauze packs (excluding eyelids). The eye may be protected by holding a metal shield over the eye itself to pose more skin surface for treatment,
 - For treatment of the eye lid, a lead eye shield will be used.
- All personnel within the operating room shall wear appropriate protective eyewear.
- Different laser wavelengths require different eyewear. Check the label or protective eyewear for the appropriate type.
 - Protective eyewear should be inspected by the laser team member before the procedure.
 - When using the laser through a microscope or endoscope, all personnel in the operating room must use appropriate eye protection.
 - Endoscopic lens covers with special filtering can be used during microscopic procedures to provide appropriate protection.
 - Warning signs stating that eye protection is needed must be placed on all access doors to the operating room where a laser procedure is in progress. Appropriate protective laser glasses should be available at each entry door.
 - Windows must be covered with black laser drapes for all laser cases. This will ensure standardization for all laser cases in the OR at The University of Toledo Medical Center.

GLOVES AND SMOKE EVACUATOR

- Gloves should be worn to prevent cross-contamination.
- Smoke evacuation must be used when plume is present.
- The laser will not be activated until the smoke evacuation tube is positioned near the laser tissue interaction site (on CO₂ cases), and the smoke evacuator is operating.

6. Laser Foot Pedal Placement:

The laser foot pedal will be operated only by the surgeon using the laser. The laser foot pedal will be identified verbally by the laser team member when placing it for use. All other foot pedals will be verbally identified and placed in appropriate area to decrease confusion during laser procedures. No foot pedal will be placed on or near liquids to minimize the chance of electrical hazards. All foot pedal electrical wiring must be inspected by the laser team member before each use for fraying or breaks that could lead to electrical shock or fire.

7. Fire Safety

- All laser team members will complete annual OR fire safety competencies and simulated fire emergencies.
 - Wet draping materials will be used around areas that are close to the intended laser site to decrease possible ignition by a direct or indirect laser beam. These materials should be remoistened periodically to ensure proper protection.
 - A basin with 1000ml of saline or water must be readily available in case of fire.
 - During laser procedures on the lower bowel, the rectum may be packed with a wet radiopaque sponge to reduce the risk of methane gas explosion or fire.
 - During laser procedures on the trachea, special fire prevention precautions must be followed in collaboration with anesthesia personnel to decrease the chance of an endotracheal (ET) tube fire.
 - Special ET tubes, designed for use during laser procedures, shall be used. Prior to intubation, lubricate cuffs completely with a water-soluble lubricant following intubation; fill the cuff with sterile saline.
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 - Nonexplosive anesthetic gases must be used during laser procedures. Nitrous Oxide should be avoided, and every attempt should be made to deliver the lowest FIO₂ while still maintaining adequate oxygen saturation of the patient.
 - Non-reflective instruments should be used whenever possible.
 - The laser should not be activated in the presence of flammable agents (eg, antimicrobial skin prep or hand antisepsis agents, tinctures, de-fatting agents, collodion, petroleum-based lubricants, phenol, aerosol adhesives, uncured methyl methacrylate) until the agents are dry and vapors have dissipated.
8. Surgeries with planned laser use must follow these requirements regarding flammable germicides or antiseptics:
- Nonflammable packaging
 - Unit-dose applicators
 - Preoperative "time-out" prior to the initiation of any surgical procedure to verify the following:

- i. Application site is dry prior to draping and use of surgical equipment
- ii. Pooling of solution has not occurred or has been corrected
- iii. Solution-soaked materials have been removed from the patient vicinity prior to draping and use of surgical devices.

- A fire extinguisher should be readily available in case of fire.

In the event of a fire, the circulating nurse will initiate Code Red procedure.

8. Laser Operation and Controlled Access

- The laser will be operated only by personnel who have had training in laser safety and operation of the specific laser unit.
- At least one member of the laser team will be present to operate the laser and monitor safety, in addition to the personnel required to perform procedure. The laser team member is responsible for the laser and its safe operation. The laser team member will not function in the capacity of the circulator during the procedure.
- Keys will be removed from the laser when not in use and stored in the Operating Room Sterile Core cupboard between OR's #4 and #5.
- Each laser will be tested by a Laser Surgical Nurse or Surgical Technologist for proper function prior to the first procedure of the day or after laser has been moved to a different room. (Refer to testing procedure for specific laser).
- If the laser is not functioning properly, the laser will not be used until the problem has been corrected. Biomed will be notified immediately to repair the laser or make repair arrangements.
- The laser foot pedal will be operated only by the surgeon using the laser. The laser foot pedal will be identified verbally by the laser team member when placing it for use.
- The surgeon is responsible for selecting laser settings (watts, duration, mode).
- During the procedure, the laser team member will operate the laser (depending on laser being used) according to the surgeon's requested settings and within guidelines determined by the manufacturer's instructions for use.
- Only the surgeon, or resident under direct supervision of the surgeon, will operate the laser power activation controls.
- The laser will be placed in "STANDBY" when the surgeon removes his hands or eyes from the field or the laser equipment. The surgeon will give a verbal "STANDBY" command.
- The laser will be placed in "STANDBY" mode on verbal command from the surgeon when changes in laser setting are requested. Changes in laser settings will be announced by the laser team member for verification.
- The laser will remain "OFF" when not in use.
- Any laser use determined to be "unsafe" by laser staff will be cause for the laser to be shut down and the situation evaluated before laser use may resume. Such occurrences will be reported

immediately to the Operations Supervisor or designee of the Operating Room and Technology Support.

- Laser equipment and accessories will be maintained according to manufacturer's recommendations by Technology Support.

9. Proper Instrumentation

- Instruments can be ebonized or matted to decrease laser beam reflection reducing the risk of potential eye or fire injury. Laser instrumentation should not be etched because the surface will be disrupted and this may allow reflection.
- Instruments (such as large retractors) may be covered with wet towels or sponges to decrease the chance of laser reflection.
- Stainless steel mirrors used to purposely reflect the laser beam must be inspected regularly for cracks or damage that would decrease the reflective accuracy.
- Glass rods should NOT be used during laser surgical intervention because of the shattering that can occur from the laser energy absorption and heat build-up. Metal rods should not be used because of the heat absorption and retention that could cause adjacent tissue damage. Teflon rods should not be used since they can melt and produce a toxic plume when struck by the laser beam.
- Pyrex, quartz, or titanium rods can withstand laser impact and thus decrease the chance of laser reflection or damage to the rod material. Clear pyrex or quartz rods will allow transmission of the argon and Nd:YAG beams, **Nd:YAG (neodymium-doped yttrium aluminum garnet; Nd:Y₃Al₅O₁₂)**.
- Proper endotracheal tube preparation should be performed to reduce the risk of endotracheal tube fires. A special "laser" endotracheal tube can be used that will withstand limited amounts of laser impact.
- Plastic vaginal and rectal specula should not be used as they may burn or melt when struck by the laser beam.
- The Laser Safety Nurse or Surgical Technologist will test the laser impact on the material pre-op if there is any question as to the durability or flammability of the instrument in a laser environment.

Approved by:		Review/Revision Date:		
/s/				
Kurt Kless, MSN, MBA, RN, NE-BC	Date	10/93	4/05	5/1/16
Chief Nursing Officer		7/96	8/20/2008	3/2018
		8/99	10/01/2011	4/2018
		7/02	10/2014	6/2022
Review/Revision Completed By:				
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Reviewed: 3/2022				
Revised: 3/2022				
Reviewed by: Nursing Policy & Standards Committee: 6/2022				

	Next Review Date: 6/2025
Policies Superseded by This Policy: 3364-124-57, 3364-124-58, 3364-124-59, 3364-124-61, 3364-124-62	

It is the responsibility of the reader to verify with the responsible agent that this is the most current version of the policy.