Laser Safety Meeting Kit

WHAT'S AT STAKE

Laser-emitting tools and equipment are common to many work situations. Lasers in printers, grocery store scanners, construction tools, and laser pointers are generally lower powered and designed to be safe, but when they are misused or handled improperly, they can pose a hazard.

WHAT IS A LASER?

The term **"laser"** is an acronym that stands for **"Light Amplification by Stimulated Emission of Radiation"**. Laser light is a form of non-ionizing radiation. Laser equipment produces and amplifies light that has unique properties that cannot be produced any other way. The light that it produces is monochromatic – it is composed of one single color at a specific wavelength. Laser radiation can be generated in different parts of the spectrum – ultraviolet (UV), visible light, and infrared (IR).

WHAT'S THE DANGER

EYE HAZARDS WHEN USING LASERS

The eye is the most vulnerable to injury from a laser beam. The potential for injury depends on the power and wavelength of the laser beam (light). Intense bright visible light makes us blink as a reflex reaction. This closing of the eye provides some degree of protection. However, visible laser light can be so intense that it can do damage faster than a blink of an eye. The invisible infrared laser beam, such as carbon dioxide (CO2) laser beam, does not produce a bright light that would cause the blinking reflex or the pupil to constrict and, therefore, chances of injury are greater compared to visible light beam of equal intensity.

The location of the damage depends on the optical nature of the laser beam. Lasers in the visible light and near infrared range

focus on retina. Therefore, the injuries produced are retinal burns. The infrared radiation is absorbed in the cornea and may cause corneal damage and loss of vision.

SKIN HAZARDS AND PROTECTIVE CLOTHING

The potential for skin damage depends on the type of laser, power of the laser beam, and the duration of exposure. The type of damage may range from localized reddening to charring and deep incision.

Protective clothing (gown, cap, mask), gloves, and safety eye wear may be required for working near a laser.

SOURCES OF FIRE HAZARDS FROM LASERS

A fire can be started when laser beam or reflection of the beam strikes a combustible material such as rubber, plastic, human tissues, paper products, skin treated with acetone and alcohol-based preparations, human hair, and intestinal gases.

ELECTRICAL HAZARDS FOR WORKERS

Many lasers use high voltage and high current electrical power. The danger of electrical shock or electrocution arises when an untrained or unauthorized person tries to perform maintenance work without following the proper safety procedures. Electrical safety requirements include the following:

- Use proper grounding for metal parts of the laser equipment.
- Label laser equipment with electrical rating, frequency and watts.
- Prevent explosions in high pressure arc lamps and filament lamps.
- Avoid contact with electrical components, including capacitors which can contain an electrical charge even after the power is turned off.
- Ensure that combustible components of electrical circuit are short circuit tested.
- Make sure that there is no electromagnetic interference between the laser equipment and other electrical equipment.

HOW TO PROTECT YOURSELF

EYE PROTECTION – SELECTION OF PROTECTIVE EYE-WEAR

Plastic versus glass lenses: Protective eye glasses typically are available with plastic lenses. Plastic lenses are light weight and can be molded into comfortable shapes. However, care is needed because they can be affected by heat, and/or UV radiation which can darken the lens or decrease its ability to absorb laser energy.

Alignment eye wear: This type of eye wear is used for low power visible laser beams. Alignment eye wear should not be worn during the operation of high power or invisible laser beams. Instead, safety eye wear that provides adequate protection should be worn.

PREVENTATIVE MEASURES FOR THE FIRE HAZARD

- Train personnel to develop awareness about fire hazards and response procedures in case of laser fires.
- Make sure that hot tip of the laser does not touch combustible items.
- Maintain precise control of laser beam.
- Eliminate surfaces which can reflect laser beam.
- During surgery the laser beam should be in the stand-by position at all times except when the handpiece is in the hand of the surgeon.
- Make sure that skin preparation solutions are fully vaporised before covering the area with surgical drapes.
- Follow standard procedures in the event of fire or explosion.

SAFE WORK LASER PRACTICES

There should be a laser safety program in place and all staff who work with the laser unit should receive:

- Training on proper procedures for the safe use of equipment.
- Instructions about how to keep equipment in good working order.
- Instruction and training to protect patients and clients

from exposure.
- Education about possible health and safety hazards to all workers.

FINAL WORD

The first rule of laser safety is: NEVER UNDER ANY CIRCUMSTANCES LOOK INTO ANY LASER BEAM!