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## LuxarCare News

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## Laser-Tissue Interactions

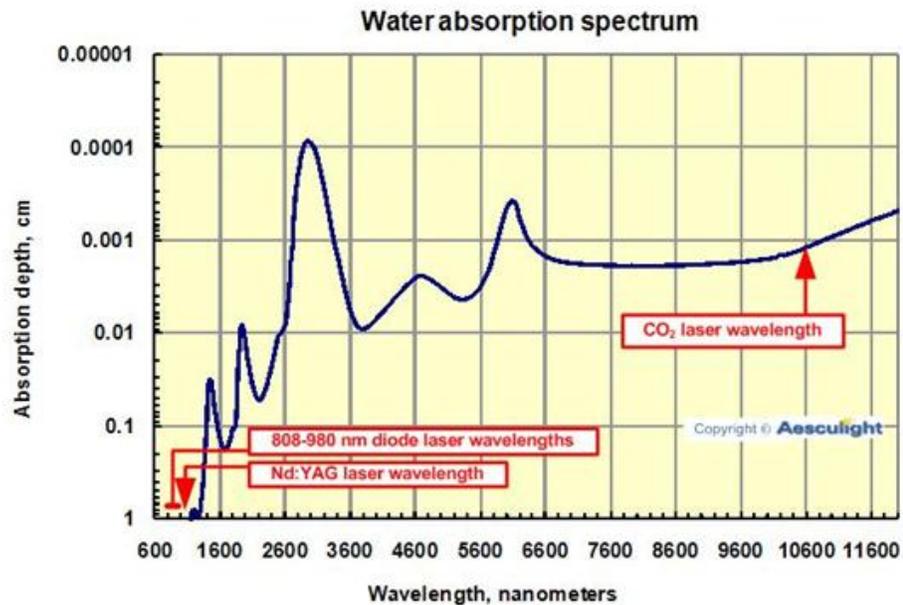
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The CO<sub>2</sub> laser is used in a broad range of clinical applications. The surgical laser can augment and, in many instances, even replace traditional instruments and methods. The Aesculight and Luxar CO<sub>2</sub> surgical lasers are useful in procedures where:

- Surface penetration is desired;
- Soft tissue is the target.

### Laser - Tissue Interaction

Lasers differ from each other by the wavelength of light they produce. The CO<sub>2</sub> laser wavelength of 10,600 nanometers is highly absorbed by soft tissues with high water content - see the water absorption spectrum below. Many tens thousands of CO<sub>2</sub> surgical lasers are being used today in surgical suites around the world.



The Luxar laser is operated in a non-contact fashion. The tip is held close to, but does not touch, the target tissue. The tissue effects are different from contact lasers, where the primary effect is a result of heat conducted from the tip to the tissue. The primary determinants of laser effect on tissue are:

- Wavelength;
- Tissue type;
- Power density;
- Exposure time.

Exact guidelines on various surgical laser techniques are presented in the Aesculight Laser Operator's Manual as well as Luxar Laser Operator's Manual.

### Laser Physiology

The CO<sub>2</sub> laser is cleared by the FDA for soft tissue procedures only. The laser is an effective hemostatic tool for vascular tissue. When the CO<sub>2</sub> laser is used for muscle dissection there is minimal heating or contraction of the muscle. This helps facilitate certain procedures and reduce post-surgical pain and edema. Proper use of Luxar CO<sub>2</sub> surgical lasers within the FDA-cleared indications for use may offer some of the following advantages over conventional treatment:

- Improved access to some areas, compared to the scalpel;
- Reduced operative time in some procedures;

- Tissue sculpting ability;
- Easier removal of lesions without distortion of surrounding tissue;
- Less bleeding, often with less trauma;
- Less need for suturing;
- Reduced postoperative pain and discomfort;
- Minimized ecchymosis and edema.



Patients often report less postoperative pain with laser wounds. The laser is more versatile than conventional surgical instruments because it can:

- Incise or excise;
- Vaporize or ablate;
- Provide hemostasis.

As is the case with any other surgical instrument, no one should use the Luxar surgical laser, or any other medical laser, without specific training in both medical laser use and laser safety.

The CO2 laser is not cleared by the FDA for use on bone or in hard tissue procedures in the United States.

## Laser surgery benefits for the clinician

### Improved visibility of the surgical field

The laser beam seals capillaries and small blood vessels as it "cuts" the tissue. This dramatically reduces bleeding, resulting in a much drier and clearer surgical site. In addition, the Luxar surgical laser does not use the very distracting aiming beam usually associated with outdated articulated arm CO2 laser systems.

### Reduction of procedure time

The hemostatic effect of the CO2 laser beam and the improved visibility of the surgical field reduce the time needed to perform the surgery, and may also reduce the need for sutures, bandaging, and other after-care measures.

### Pinpoint accuracy and control

The diameter of the beam may be adjusted down to a small fraction of a millimeter or expanded to address a much wider swath. The power of the beam may be set for rapid removal of relatively large tissue amounts, or adjusted to remove only one or two cell layers at a time.

### Increased surgical capabilities

Laser surgery changes the character of many procedures by making them simpler or by reducing risk. This opens up the possibility of expanding the clinician's surgical repertoire to include procedures that are not practical with conventional scalpel-based techniques.

## Laser surgery benefits for the patient

### Less Pain

The laser seals lymphatics and nerve endings as it cuts, resulting in less edema and pain that leads to a more comfortable post-operative recovery.

### Reduced risk of infection

CO2 laser surgery is a "no touch" technology. The laser beam kills bacteria in its path, producing a sanitizing effect.

### Quicker recovery time

Reduced risk of infection, less bleeding, less swelling, and less pain often allow the patient a more rapid return to normal activities.

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