

LightScalpel — Advancing flexible fiber CO₂ lasers since 1991

www.LightScalpel.com / 1-866-589-2722

LightScalpel legacy

LightScalpel finds its roots in the revolutionary flexible CO₂ laser fiber and all-metal CO₂ laser tube technologies since it was introduced to dentists by Luxar Corporation in 1991 as the first ever soft tissue surgical CO₂ laser, designed specifically for a small office environment. Over 12,000 dentists, physicians, and surgeons worldwide enjoy the many praised clinical benefits and ease of use of the flexible fiber CO₂ laser (see bloodless laser Stage II implant uncovering in Figure 1 and bloodless laser frenectomy in Figure 2).

In 2002, following the sale of Luxar to a large multinational corporation, its former principals, Paul Diaz, MSc, EE, and Dr. Peter Vitruk, PhD, started LuxarCare LLC, whose mission was to provide total support for Luxar laser owners with affordable accessories and reliable repairs. Started in Dr. Vitruk's garage in Seattle, Washington, and working with nothing more than extensive laser technology knowledge, LuxarCare has grown to become an exclusive accessory and repair provider for all Luxar lasers in North America. Many dentists in the United States are still using lasers that they purchased in 1991-1993. No other laser company in the world has a longer history and more consistent track record of keeping surgical lasers in business since the early 1990s.

In the mid-2000s, the LuxarCare owners set their eyes on creating the next "Best in Class" dental and surgical laser. Soon, the LightScalpel brand was born.

LightScalpel's mission and vision

LightScalpel's founders defined and charted the course to provide a superior customer experience focusing on:

- Latest in laser-tissue interaction science
- U.S.-based laser technology, manufacturing, and customer service excellence
- Dedication to laser training and education

LightScalpel team

Gathering together many talented and experienced former Luxar Design and Manufacturing Engineers, LightScalpel founders, Drs. Vitruk and Diaz, took on the challenge of designing and building the next generation of dental CO₂ surgical lasers. LightScalpel scientists, engineers and technicians share 300-plus years of combined experience of leadership in laser dentistry, surgery, and medicine. Launched in 2013, LightScalpel lasers feature re-engineered flexible fibers and handpieces, as well as further enhanced reliability and longevity of its rugged all-metal laser tube technology. At the same time, LightScalpel continues to focus on LuxarCare's founding principles of exceptional customer service and technical support.

Wavelength matters: soft tissue ablation and coagulation

The highest order priority of the LightScalpel mission was a review of laser-tissue



Testimonials

CO₂ is the gold standard for laser technology, for soft tissue procedures ... [diodes] are inefficient compared to the speed of CO₂ ... CO₂ simply cuts and ablates tissue much faster. Does the laser pay for itself in terms of the vast amount of time it's saving me, the lack of needing second appointments and follow-ups? Absolutely. Take tending for example — the laser quickly eliminates 15-20 minutes of cord-packing time. Multiply that out — having done crowns for over 20 years with the laser — efficiency is a huge cost saver for me.



*Alan Winner, DDS
New York, New York*

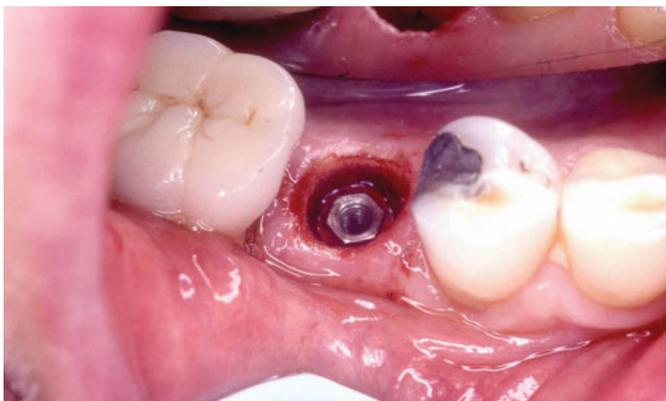


Figure 1: Stage II implant uncovering with Luxar CO₂ laser (Photo courtesy of Stuart Coletton, DDS, White Plains, New York)

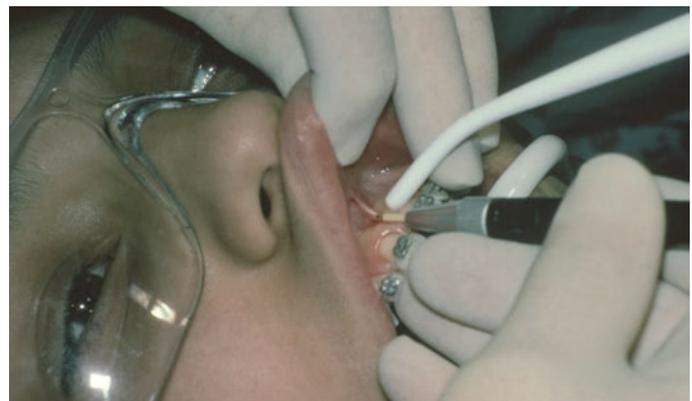


Figure 2: Luxar CO₂ laser soft tissue dental procedure frenectomy in progress (Photo courtesy of Alan Winner, DDS, New York, New York)

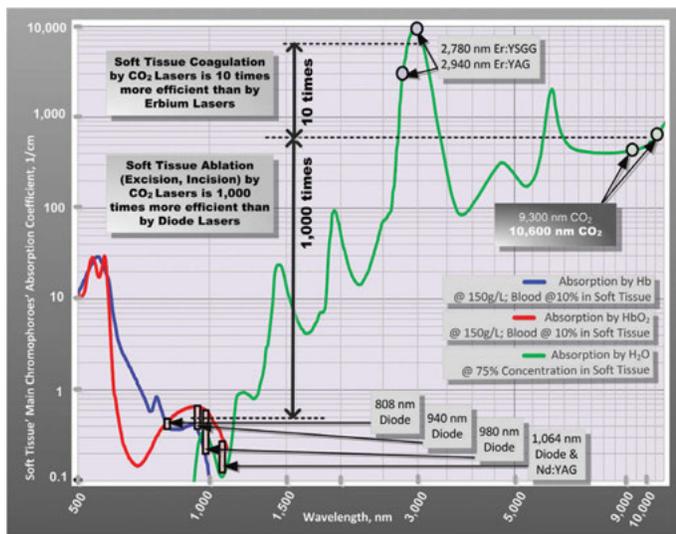


Figure 3: Optical absorption coefficient spectra at different histologically relevant concentrations of water, hemoglobin (Hb), oxyhemoglobin (HbO₂), and melanin. Logarithmic scales are in use

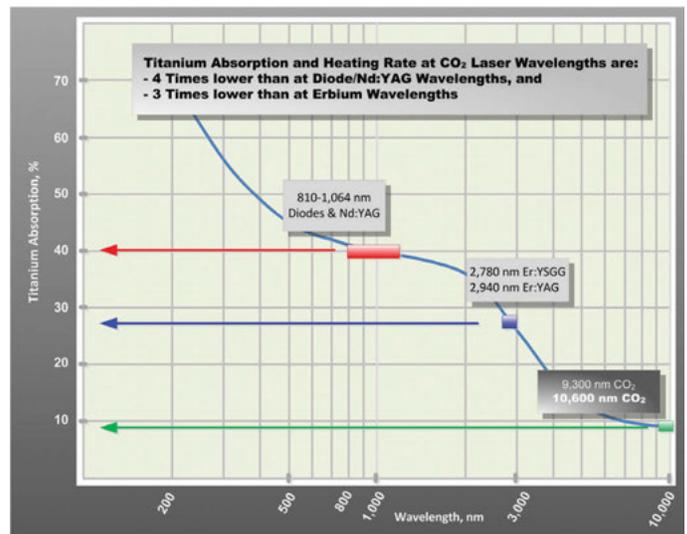


Figure 4: Titanium optical absorption spectrum

interaction science. Presented in Figure 3 is the modern-day understanding¹ of how different laser wavelengths interact with the main chromophores (absorption centers) in the oral soft tissue for the *three* wavelength groups of practical dental lasers:

- circa 1,000 nm (diodes and Nd:YAG laser)
- circa 3,000 nm (Erbium lasers)
- circa 10,000 nm (CO₂ lasers)

As illustrated in Figure 3, wavelengths circa 10,000 nm are 1,000-plus times superior to 800-1,100 nm wavelengths for soft tissue ablation. At the same time, the wavelengths circa 10,000 nm are 10-plus times superior to wavelengths circa 3,000 nm for soft tissue coagulation. Naturally, LightScalpel's choice was the CO₂ laser as the only wavelength that delivers excellent ablation with simultaneous coagulation (unobtainable with either diodes or Erbium wavelengths).

Wavelength matters: implants

The future of dentistry is unthinkable without implants. Naturally, the next step in evaluating the appropriate laser wavelength for the needs of modern-day and future dentists was the study of laser-implant interaction properties. Presented in Figure 4 is the absorption spectrum of titanium,² the most common implant material. Once again, LightScalpel's choice for the CO₂ laser wavelength is based on solid scientific foundation and assures that implants are affected (heated) approximately 4 times less than at diode and Nd:YAG wavelengths (circa 1,000 nm) and approximately 3 times less than at Erbium laser wavelengths (circa 3,000 nm).

LightScalpel fiber and handpieces

The 1.75 meter extended reach of the LightScalpel fiber allows for convenient positioning of the laser in relation to both patient and dentist, making it ideal for a dental office. The LightScalpel flexible fiber and handpieces (Figure 5) provide the clinician with the most natural "scalpel-like" feel. The fiber is durable, light, maneuverable, and offers high precision for unparalleled focus ability of the laser beam.

LightScalpel top performance and lowest cost maintenance: all-metal laser tube

The LightScalpel proprietary all-metal CO₂ laser tube (Figure 6) lasts for up to

The laser enables us to achieve some really dramatic results for soft tissue. By sealing blood vessels, lymphatic vessels and nerve endings, my laser enables me to operate with a dry surgical field; meanwhile, the clinical benefits of reduced pain, minimal bleeding, and faster recovery for my patients cannot be stressed enough ... The CO₂ wavelength is far superior for the soft-tissue surgeries I'm doing.



Mark Docktor, DDS
Hoboken, New Jersey



Figure 5: LightScalpel laser fiber, autoclavable handpieces, and laser console

It's so much easier with the flexible fiber waveguide... Using the waveguide, particularly inside the mouth... it's like having a pencil in your hand. You just can't do that with articulated arms ... Relative to CO₂, there is simply a greater zone of necrotic tissue damage with electrocautery ... The laser has paid for itself a hundredfold. I use it every day...



Stuart Coleton, DDS
White Plains, New York

The flexible fiber waveguide is essential to the work that I do. With my flexible waveguide and my contra-angle tip, there's no place in the mouth I can't reach! Every area of the mouth is accessible, and that's a fantastic advantage.

The SuperPulse wave configuration works much faster and creates much less tissue damage. I use SuperPulse for almost all of the "cutting" procedures, like gingivectomies and frenectomies – it's a big advantage to have it... in general, the SuperPulse is a great advancement in CO₂ lasers.



Steven A Guttenberg, DDS, MD
Washington, DC

45,000 hours (7-plus years), is inexpensively rechargeable, capable of handling extreme shocks and vibrations, and is easily pulsed and air-cooled under the heaviest operating conditions.

LightScalpel-assisted soft tissue oral surgery

The LightScalpel installed base in dentistry is rapidly growing, thanks to LightScalpel's price point being more than \$20,000 below competitive offerings (from overseas), and thanks to the unprecedented versatility of its handpieces and controls. Figures 7 and 8 illustrate some of the LightScalpel's applications that allow it to boost profitability (as reported by dental practices using LightScalpel) because of performing soft tissue procedures much quicker and virtually bloodless. Without

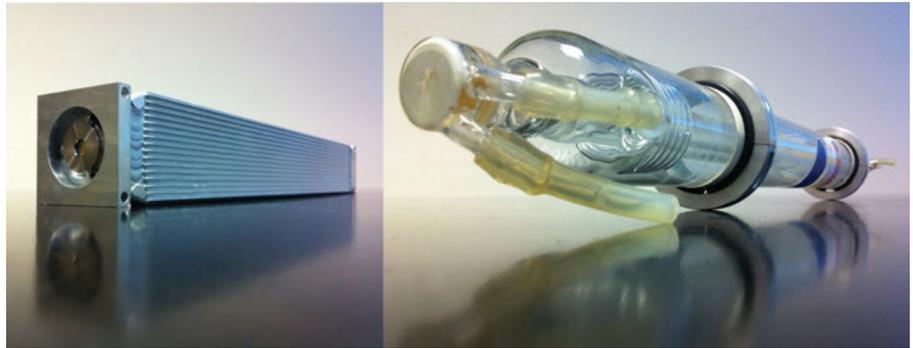


Figure 6: LightScalpel laser tube (left) versus imported antiquated glass tube CO₂ laser tube (right).



Figure 7: Stage II implant uncovering with LightScalpel CO₂ laser (Photo courtesy of Grant Selig, DDS, Las Vegas, Nevada)



Figure 8: LightScalpel CO₂ laser fibroma removal (Photo courtesy of Robert Levine, DDS, Scottsdale, Arizona)

LightScalpel, many soft tissue procedures would be referred out (and revenues lost), or much longer time would be spent (and vital efficiencies and profits lost because of the bleeding and suturing) on such procedures performed with a blade. **IP**

REFERENCES

1. Jacques SL. Optical properties of biological tissues: a review. *Phys Med Biol.* 2013;58(11):R37-61.
2. Derived from Wolfe WL, Zissis GJ. *The Infrared Handbook.* Office of Naval Research, NAVY, Wash. DC, 1985;7-81.

This information was provided by LightScalpel.

Soft tissue incision/excision/ablation/coagulation with



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LightScalpel handpieces are autoclavable, durable, and ergonomic, with straight and angled nozzles. They are designed for high-speed soft tissue incision/excision/ablation with simultaneous coagulation of the margins.



Stage II IMPLANT UNCOVERING with LightScalpel angled tipless handpiece

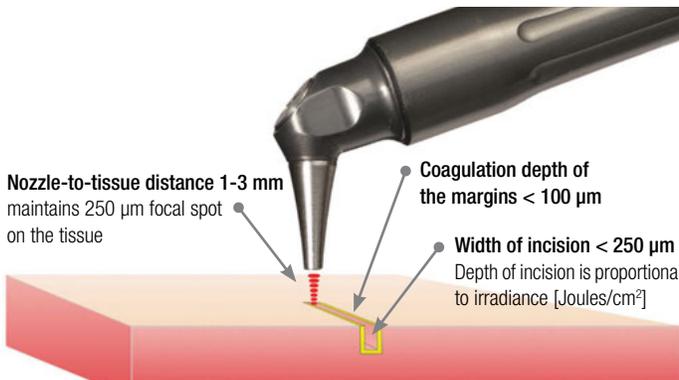
1. Healed implant site ready for uncovering
2. Tissue ablation begins in the center above the implant and continues in a circular spiraling motion
3. Implant uncovered after ablation



Photographs courtesy of Grant Selig, DDS, Las Vegas, Nevada



Incision/excision/ablation with focused laser beam



Coagulation with defocused laser beam

