



## First Look: Solea CO<sub>2</sub> Hard and Soft Tissue Laser

**Gordon's Clinical Bottom Line:** There has been so much controversy on the subject of laser dentistry that clinicians have had difficulty deciding the facts from fiction. A new laser with unique features has been evaluated by CR clinicians and scientists and looks promising for both hard and soft tissue cutting. *This candid Clinicians Report contains research on the Solea laser, identifies its advantages and limitations, and allows you to determine if this treatment technique is right for your patients.*

Dental lasers have been used for decades with success, but their high cost and the necessity to learn a new technique have resulted in few clinicians investing the time necessary to become proficient with these instruments. The Solea laser by Convergent Dental has a unique combination of features that can simplify laser dentistry.

- **Variable cutting speed** with a rheostat foot pedal controlling pulse frequency
- **User-selected spot size** via computer-controlled mirrors that direct the beam into a pattern of pulses on tissue
- **Effective ablation** of hard and soft tissue using 9.3 µm wavelength CO<sub>2</sub> laser
- **Analgesic effect** can eliminate need for injections
- **Touch-screen interface** with effective clinical settings for hard and soft tissue



Laser cutting enamel: Note green aiming beam, cooling water spray, and white flash where tissue is vaporized (the actual treatment beam is invisible)

This report includes initial clinical observations of the features and performance of the Solea laser.

### Clinical Observations

- **Laser-cut tooth preps** are different from those cut with burs. The different speed of cut on dentin and enamel produces walls and floors that are irregular and can have a V-shape or undercuts in dentin. Margins are often rounded. Burs can be used to refine laser-cut preps, if desired. These differences are not detrimental using current restorative materials and finished restorations appear similar to those accomplished with burs.
- **Soft tissue procedures** using lasers are well established, with minimal or no bleeding.
- **Analgesic effect** was verified, and is caused by rapid stimulation of nerves which blocks the pain signaling process. Treatment of multiple quadrants during one visit is possible. Patients may still perceive some sensation, and some clinicians preferred continued use of conventional anesthetics.
- **Laser effects on hard and soft tissues** included ablation (*vaporization*), melting, heating, and carbonization depending on technique, tissue, and settings. CR tests showed effective initial adhesive bonds to laser-cut dentin and enamel.
- **Laser did not sterilize preparations.** CR tests showed organisms within tooth are still viable, and others may be introduced by air/water spray. Conventional techniques for disinfection of tooth preparation prior to restoration are appropriate (*see Clinicians Report November 2009*).
- **Rotary handpiece noise and vibration** was replaced with unique sound and feel of laser treatment. Burs can be used intermittently, as desired, to refine prep or remove caries while taking advantage of analgesic effect of laser.
- **Visual feedback replaces loss of tactile feedback.** Laser is end-cutting only and usually slower than conventional methods. However, it offers advantages such as conservative, minimally invasive procedures; analgesic effect; and bloodless field. Bright flash of light created by vaporizing tissue bothered some clinicians.
- **Significant practice was required** to develop effective laser techniques. Handpiece and articulated arm are well balanced, but large and must be positioned before starting treatment. Careful observation and experience helped clinicians distinguish laser effects from tissue characteristics.
- **Effective and intuitive controls** for cut speed, spot size, and clinical treatment helped simplify and shorten the learning period.



### Solea

**Convergent Dental**

[www.convergentdental.com](http://www.convergentdental.com)

**\$117,600**

*(includes: laser unit, 2 handpieces, accessories, 1-day clinical training, and 5-year service and software updates)*

### CR Conclusions:

Solea CO<sub>2</sub> laser was clinically effective for hard and soft tissue procedures. The main challenges of laser dentistry—high initial cost and steep learning curve—were partially mitigated by the unique features which make Solea relatively easy to learn and use. Analgesic effect allowed treatment of patients without conventional anesthetics. Long-term clinical effects continue to be evaluated.



# What is CR?

## WHY CR?

CR was founded in 1976 by clinicians who believed practitioners could confirm efficacy and clinical usefulness of new products and avoid both the experimentation on patients and failures in the closet. With this purpose in mind, CR was organized as a unique volunteer purpose of testing all types of dental products and disseminating results to colleagues throughout the world.

## WHO FUNDS CR?

Research funds come from subscriptions to the *Gordon J. Christensen Clinicians Report*<sup>®</sup>. Revenue from CR's "Dentistry Update"<sup>™</sup> courses support payroll for non-clinical staff. All Clinical Evaluators volunteer their time and expertise. CR is a non-profit, educational research institute. It is not owned in whole or in part by any individual, family, or group of investors. This system, free of outside funding, was designed to keep CR's research objective and candid.

## HOW DOES CR FUNCTION?

Each year, CR tests in excess of 750 different product brands, performing about 20,000 field evaluations. CR tests all types of dental products, including materials, devices, and equipment, plus techniques. Worldwide, products are purchased from distributors, secured from companies, and sent to CR by clinicians, inventors, and patients. There is no charge to companies for product evaluations. Testing combines the efforts of 450 clinicians in 19 countries who volunteer their time and expertise, and 40 on-site scientists, engineers, and support staff. Products are subjected to at least two levels of CR's unique three-tiered evaluation process that consists of:

1. Clinical field trials where new products are incorporated into routine use in a variety of dental practices and compared by clinicians to products and methods they use routinely.
2. Controlled clinical tests where new products are used and compared under rigorously controlled conditions, and patients are paid for their time as study participants.
3. Laboratory tests where physical and chemical properties of new products are compared to standard products.



*Clinical Success is the Final Test*

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*CRA Foundation<sup>®</sup> changed its name to CR Foundation<sup>®</sup> in 2008.*



*This team is testing resin curing lights to determine their ability to cure a variety of resin-based composites.*

*Every month several new projects are completed.*

## THE PROBLEM WITH NEW DENTAL PRODUCTS.

*New dental products have always presented a challenge to clinicians because, with little more than promotional information to guide them, they must judge between those that are new and better, and those that are just new. Due to the industry's keen competition and rush to be first on the market, clinicians and their patients often become test data for new products. Every clinician has, at one time or another, become a victim of this system. All own new products that did not meet expectations, but are stored in hope of some unknown future use, or thrown away at a considerable loss. To help clinicians make educated product purchases, CR tests new dental products and reports the results to the profession.*