

# Light Curing – Guidelines for Practitioners A Consensus Statement from the 2014 Symposium on Light Curing in Dentistry Held at Dalhousie University, Halifax, Canada

Dear Readers,

A two-day international symposium on Light Curing in Dentistry was held at Dalhousie University, Halifax, Canada on May 29th and 30th, 2014. The symposium was attended by over 40 key opinion leaders from academia and industry who worked together to develop following advice to practitioners about light curing.

The symposium participants were: Bob Angelo, Ahmed Abuelyaman, Suham Alexander, Sibel Antonson, Steve Armstrong, Oliver Benz, Uwe Blunck, Ellen Bruzell, John Burgess, Peter Burtscher, Liang Chen, Ivo Correa, Matt Dailey, Colin Deacon, Omar El-Mowafy, Jack Ferracane, Christopher Felix, Reinhard Hickel, Thomas Hill, Neil Jesop, Hilde Kopperud, Daniel Labrie, Hui Lu, Lori Moilanen, Bernhard Möginger, John O'Keefe, Joe Oxman, Frank Pfefferkorn, Jeffrey Platt, Richard Price, Jean-François Roulet, Fred Rueggeberg, Janine Schweppe, Adrian Shortall, Howard Strassler, Jeffrey Stansbury, Byoung Suh, Andreas Utterodt, David Watts, Stacy Wyatt.

The support and active participation of Benco, Bisco, BlueLight Analytics, DENTSPLY, 3M-ESPE, Gigahertz-Optik, Henry Schein, Heraeus-Kulzer, Ivoclar Vivadent, Kerr, Patterson Dental, SDI, and Ultradent is gratefully acknowledged.

Over the years, we have learned that light curing matters and that there are many pitfalls the dentist may encounter when light curing resins in the tooth. Inadequate or inappropriate light curing can so easily result in weaker adhesion to the tooth and compromised physical and chemical properties within the restorative material. These undesirable outcomes will likely have a negative influence on the longevity of the restoration you have just placed.

For the benefit of your patients, please read and follow the following guidelines.

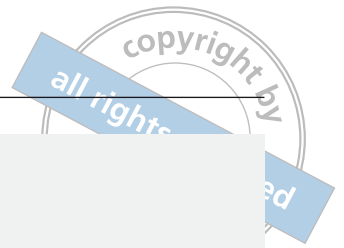
Sincerely yours



Jean-Francois Roulet



Richard Price



## LIGHT CURING – GUIDELINES FOR PRACTITIONERS A CONSENSUS STATEMENT FROM THE 2014 SYMPOSIUM ON LIGHT CURING IN DENTISTRY HELD AT DALHOUSIE UNIVERSITY, HALIFAX, CANADA

### **When selecting a light curing unit (LCU):**

- **Recognize that all lights are not created equal.** Use a LCU from a manufacturer who provides contact information, a user manual, and service. Preferably the LCU should have received a favorable report or certification from a reputable independent 3rd party.
- **Know** the key performance parameters of your LCU, when new:
  - (i) the light output (averaged irradiance over the beam-incident area in mW/cm<sup>2</sup> and spectral output from the LCU), (ii) whether the beam has a uniform and effective output (profile) across the light tip, and (iii) the diameter of the light beam.
- **Be cautious** when using high (above 1,500 to 2,000 mW/cm<sup>2</sup>) output LCUs that advocate very short (eg, 1 to 5 seconds) exposure times. When used for such short times, it is critical that the light tip is stabilized over the resin during exposure. Although some resin composites are matched to specific high output curing lights, high output LCUs may not adequately cure all of today's resin-composites to the anticipated depth when used for short exposure times. Seek peer-reviewed literature validating the efficacy and safety of such lights and materials.

### **Before you light cure, remember to:**

- **Regularly monitor** and record the light output over time, with the same measurement device and light guide. Repair or replace the LCU when it no longer meets the manufacturer's specifications.
- **Inspect and clean** the LCU before use to ensure it is on the correct setting, in good working order, and free of defects and debris.
- **Consider that every resin-based material** has a minimum amount of energy that must be provided at the correct wavelengths to achieve satisfactory results. [Energy (Joules/cm<sup>2</sup>) = output (W/cm<sup>2</sup>) × exposure time (seconds)]. However, minimum irradiation times are also required.

- **Follow** the light exposure times and increment thickness recommended by the resin manufacturer, making allowances if you use another manufacturer's light. Increase your curing times for increased distances and darker or opaque shades.
- **Select a LCU tip that** delivers a uniform light output across the light tip and that covers as much of the restoration as possible. Cure each surface independently, using overlapping exposures if the light tip is smaller than the restoration.
- **Position** the light tip as close as possible (without touching) and parallel to the surface of the resin composite being cured.
- **Stabilize and maintain** the tip of the LCU over the resin composite throughout the exposure. Always use the appropriate "blue blocking" glasses or a shield to protect your eyes as you watch and control the position of the curing light.

### **Precautions:**

- **Avoid** conditions that will reduce light delivery to the resin-composite, e.g.:
  - Holding the light tip several millimeters away.
  - Holding the light tip at an angle to the resin surface.
  - Dirty or damaged light-guide optics.
- **Supplementary light exposures** should be considered under circumstances that may limit ideal light access, such as shadows from matrix bands, intervening tooth structure, or from restorative material.
- **Beware of thermal damage** potential to the pulp and soft tissues when delivering high energy exposures or long exposure times.
- **Air-cool** the tooth when exposing for longer times, or when using high output LCUs.
- **Never shine** the LCU into the eyes, and avoid looking at the reflected light, except through an appropriate 'blue-blocking' filter.
- **Testing surface hardness** of the resin-composite in the tooth using a dental explorer provides NO information about adequacy of curing depth.

These guidelines will be published simultaneously in the following journals:

J Adhes Dent, Dental Materials, Operative Dentistry, Journal of the Canadian Dental Association