

# ADA Professional Product Review®

A Publication of the Council on Scientific Affairs

## In This Issue:

### Letter from the Editor – David C. Sarrett, DMD, MS



With this issue, the ADA Professional Product Review enters its 10th year of publication. Looking back, we've examined many popular categories—from a wide assortment of restorative materials to dental equipment such as loupes, amalgam separators, intraoral cameras and CAD/CAM systems. Over the years, we've featured product evaluations performed in the ADA Laboratory, as well as clinical and laboratory evaluations that were collaborations with dental schools, the Department of Veterans Affairs and the military. We've presented expert panel discussions on many product categories, along with features on product safety and articles on dental therapeutics. In recent years, we've added clinical techniques and product category overviews and there's more to come this year.

This issue looks at one of our most popular categories—handpieces (page 4). The ADA Laboratory purchased eight new high-speed air-turbine handpieces and examined how they compare when it comes to free-running speed, eccentricity, noise, and other criteria. The Laboratory also evaluated the sterilization efficacy of factory-lubricated and in-office lubricated air-turbine handpieces (page 24).

We also present "Light Curing Guidelines for Practitioners," a consensus statement from the 2014 Symposium on Light Curing in Dentistry, which was held at Dalhousie University in Halifax, Canada. Dr. Jeffrey Platt, member of the ADA Council on Scientific Affairs (CSA), and editor of *Operative Dentistry* was among the 40 researchers, which included some current and former CSA members, who took part in the symposium. As Dr. Platt notes, we're including the guidelines for the benefit of ADA members and the patients we serve. Is there a product or product category you'd like to see in a future issue? Drop me a line at [ppreditor@ada.org](mailto:ppreditor@ada.org).

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# 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  $\text{mW}/\text{cm}^2$  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  $\text{mW}/\text{cm}^2$ ) output LCUs that advocate very short (e.g. 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 ( $\text{Joules}/\text{cm}^2$ ) = output ( $\text{W}/\text{cm}^2$ ) x exposure time (seconds)]. However, minimum irradiation times are also required.



**Dr. Jeffrey A. Platt**,  
Member, ADA Council on  
Scientific Affairs and editor,  
*Operative Dentistry*

## More thoughts about light-curing composites

There are many factors that can impact the success of composite restorations. Moisture control during placement, good adaptation of the material to the tooth and appropriate material selection all play a role. In addition, these materials need to be well polymerized. An appropriate light curing unit should be selected to achieve good polymerization. Many clinicians are unaware of differences among LED lights on the market that have complicated the selection process. This issue was discussed in "An ADA Laboratory Evaluation of Light-Emitting Diode Curing Lights," ADA Professional Product Review, Volume 9, Issue 4. But, once an appropriate unit is in hand, how it is handled is important. The accompanying consensus statement was drafted by a group of 40 leading researchers — including some current and former members of the ADA's Council on Scientific Affairs clinicians and manufacturers in the field of light curing that met at Dalhousie University in Halifax, Canada, in May 2014. The statement was originally published in *Dental Materials*, *Journal of Adhesive Dentistry*, *Journal of the Canadian Dental Association*, and *Operative Dentistry*. The consensus statement addresses important issues to be considered every time that a light curing unit is used. It is provided here as it appeared in *Operative Dentistry* for the benefit of ADA members and the patients we serve.

■ **Follow** the recommended 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 shield to protect your eyes as you watch what you are doing with 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 potential thermal damage 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.

\* *Operative Dentistry*, 2014, 39(6), 561-563. Reprinted with permission

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