

SCIENTIFIC REPORT

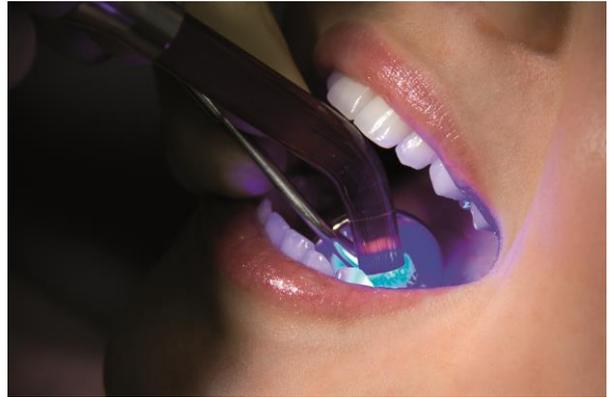
Light curing – Information for users

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Light curing is an essential aspect of adhesive restorative treatment. This Scientific Report summarises the points raised at the “Light curing in dentistry” symposium in Halifax, Canada, in 2014.^[1]

There are a number of points to consider when choosing a light-curing unit

All curing lights are manufactured differently.

- Use a light-curing unit from a manufacturer who provides contact information, includes instructions for use and has a Customer Service department. Wherever possible, the light-curing unit should boast a positive review from a respected independent testing authority and display a corresponding certificate.

Know your curing light's output parameters.

- What is its light output (average light intensity in mW / cm^2 measured via the light tip; what wavelength range is covered)?
- Is the light output distributed evenly and effectively across the beam of light?
- What is the diameter of the beam of light?

Be particularly careful when using high-performance curing lights (above $1,500$ to $2,000 \text{ mW} / \text{cm}^2$); these curing lights are often associated with very short curing times (e.g., 1 to 5 seconds). In the case of such short curing times in particular, it is especially important to stabilise the light guide sufficiently over the restorative. Although some resin-based composites are tailored to the specific high-performance curing lights, it is certainly possible that not all composites available on the market cure sufficiently at the required depths, even when a light-curing unit with a high light output is used. Consult specialist journals with expert test panels for confirmation of whether your devices and materials can be used in combination effectively and safely.

Before beginning the light curing, please observe the following:

Regularly check the light output of the light-curing unit and record the values; always use the same measuring device and light guide when doing so. Have your curing light repaired or replace the light guide if the values obtained do not correspond to the manufacturer's specifications.

Inspect and clean the light-curing unit before using it. Has it been set correctly? Is the curing light in good condition? This can help you to rule out defects and soiling.

Please note that **every resin-based material** requires a minimum of energy in the correct wavelength to cure successfully.

[Energy (Joules / cm²) = output (W / cm²) x curing time (s)].

In addition, compliance with minimum curing times must also be ensured.

Comply with the curing times and maximum layer thicknesses specified by the composite manufacturer, especially when using light-curing units from other manufacturers. Extend the curing time when working from a greater distance and when using dark and opaque shades.

Select a light guide which boasts as even as possible distribution via the light tip and covers the restoration as completely as possible. If the light tip is smaller than the restoration, cure the sections individually, taking care to overlap.

Position the light tip as close to the restorative material as possible (without actual contact) and hold it parallel to the surface.

Stabilize and maintain the light tip over the restorative for the **corresponding period of time**. When doing so, always use suitable protective goggles/shields in order to protect your eyes. The use of a light shield allows you to check the position of your light-curing unit safely during the curing.

Precautionary measures

Avoid the following situations, which can reduce the supply of light to the restorative:

- Holding the light tip several millimetres away
- Holding the light tip at an angle to the restoration surface
- Using a soiled or damaged light guide

Perform **additional light-curing cycles** if the clinical situation limits the light supply, e.g., due to shadows thrown by matrix bands, neighbouring dental hard tissue or restorations.

Ensure that you are aware of the **risk of heat damage** to the pulp and soft tissue if high light intensities or long curing times are employed.

Cool the tooth with air if you intend to cure for a long time or are using high-performance curing lights.

Never look directly into a light-curing unit and avoid looking at directly reflected light – unless using suitable eye protection.

Testing the surface hardness of the cured restoration in the tooth using a dental explorer does not give you any information about the sufficient depth of cure.

[1] J Adhes Dent, Vol 16, No 4, 2014.