Talking with Patients

Light-Curing

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WHAT IS IT?

Dental light-curing units are devices that emit light within a specific wavelength for the purpose of curing or hardening resin-based restorative materials. In the most frequently used light-curing units, the light is generated by a halogen bulb and boosted by a reflective mirror attached to the bulb. An internal filter then filters the light, and the blue portion of the visible light spectrum is emitted through the unit's tip. Other light-curing devices include argon laser curing units, plasma arc curing units, and most recently, blue light emitting diodes (blue LED).

WHEN IS IT NEEDED?

Light-curing is used in dentistry to cure, set, or polymerize many types of resin-based dental materials. These materials are called light-cured and include resin-based restorative composites, bonding agents, and specific dental cements. Light-cured materials have light-sensitive initiators that, when exposed to light in a specific wavelength, initiate a chemical reaction (polymerization) that ultimately leads to the set or cure of the material. Light-cured resin-based composite restorative materials, for example, are soft and putty-like before curing and hard and rigid after curing. This enables the dentist to insert the unset composite material in the tooth before hardening the material with the curing light. Many laboratory-fabricated ceramic restorations, such as porcelain veneers and small inlays, can be bonded to tooth preparations with light-cured resin-based adhesives and composite cements.

It should be noted that the light emitted by light-curing units can be harmful to the eyes when looked at directly. Several types of plastic shields and protective lenses are available to protect dentists and assistants from this potential hazard. Such protective devices are orange-colored to neutralize the blue light emitted by the light-curing units.

ADVANTAGES

- control of setting time
- more thorough curing than chemical curing
- control of the working time of materials (operator is not bound to the speed of chemical reaction)

DISADVANTAGES

- requires special equipment
- can cause eye damage with extended eye exposure
- requires periodic checking of power output and occasional replacement of lightbulb (some devices)
- limited depth of cure

CONCLUSIONS

Light-curing is extensively used in dentistry to cure or set a number of resin-based dental materials. Virtually all procedures involving resin-based composite or adhesive bonding take advantage of light-curing technology.

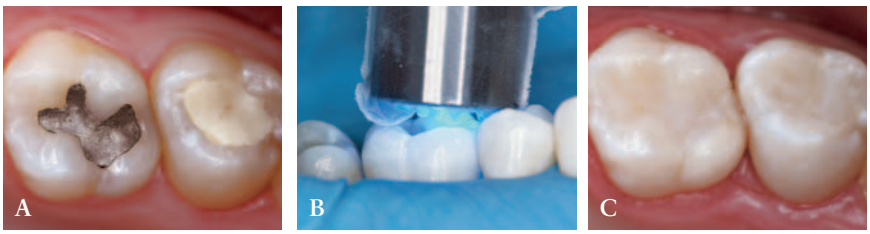

Figure 1. A–C, *A clinical case in which two posterior teeth were treated using a light-curing unit to cure a resin-based composite restorative material.*

Figure 2. An example of a light-curing unit.

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