

PHOTOPOLYMERIZATION DEVICES

Girgis Andro Emad Farag

Student, Volgograd State Medical University, Russia, Volgograd

Wafi Sonia Nasir Ahmad

Student, Volgograd State Medical University, Russia, Volgograd

Badawi Kerolos Sami Hana

Student, Volgograd State Medical University, Russia, Volgograd

Amad Fatemeh

Student, Volgograd State Medical University, Russia, Volgograd

Safari Mohammad Hossein

Student, Volgograd State Medical University, Russia, Volgograd

Arshadi Atena

Student, Volgograd State Medical University, Russia, Volgograd

Composite filling materials are one of the main restorative materials in dentistry. In the 70s, a new generation of one-component, homogeneous composites was developed, hardening according to the "command" - when irradiated with light of a certain wavelength - light-curing filling materials. They were initially sensitive to ultraviolet rays and then became sensitive to visible light. The light-curing procedure consists of two components: the directly light-curing composite and the polymerization lamp.

The following types are distinguished:

1. LED (emit "cold light" - low temperature emitted by light) (LED - Light Emitting Diode)
2. plasma (PAC - Plasma Arch).
3. halogen (the wave spectrum of the emitter is in the range of 400-500 nm, corresponding to the absorption spectrum of the catalyst)
4. laser (is a monochromatic source of photons with a strictly defined wave spectrum).

There are multifunctional dental photopolymerizers that provide additional modes: diagnosis of early caries, hidden carious cavities, enamel cracks, chips; quality control of restoration and adaptation of composite materials to hard dental tissues; precision of crown placement; condition of the oral mucosa; teeth whitening.

The photopolymerizer consists of:

1. Emitter

2. Light guide clamp
3. Fan (if it is a regular lamp)
4. Protective screen

Emitter - a device containing a light bulb or LEDs. It is made in the form of a pistol and is fixed on the base unit, which contains a set of electronic devices that control the operation of the lamp. This usually includes a timer, its function is time control, buttons for controlling lamp functions, and there may be a built-in sensor for controlling the radiation density.

Light guide - most often contains a light filter at its base, which provides the required color of the light spectrum and the wavelength necessary for polymerization. All light guides differ in diameter and the filter used. The most common diameter is 8mm.

There are two types of light guides - multi-fiber and mono-fiber.

-Multifiber light guide is used much more often and always has a black, brown or opaque surface. These light guides have the significant advantage that the light appears only at the tip and therefore there is no loss as it travels. This is of great importance with halogen lamps, which always scatter some UV light, but less important with LED emitters. The disadvantage is the reduction in active surface area since each fiber has a dark, non-conductive surface. Since reducing the active surface area can reduce lamp power by 20%, miniLED prefers a monofiber light guide.

-Monofilament light guides rarely have a black surface (they look like a glass rod). Their disadvantage is the relative inconvenience for the operator, which, however, is easy to adapt to. The advantage is the illumination of the inner surface of the oral cavity, which reduces the light contrast between the tooth and the almost dark oral cavity.

Security system:

-The lamp cooling fan in the handle starts heating the lamp to a certain temperature and automatically stops after the lamp has cooled to a safe temperature.

- If the halogen lamp remains on for a long time, the fan automatically continues to operate until the lamp in the handle cools to a safe temperature.

With a long operating time (usually 5 - 10 minutes), overheating protection may automatically turn on. In this case, the red "overheating" indicator light comes on and the halogen lamp automatically turns off. After 2-3 minutes of intensive fan operation, the device is ready for use again; the red lamp goes out, the green lamp comes on.

Conclusion. Compared to LED lamps, halogen lamps emit a lot of heat and excessive spectrum, heat the tooth tissue and significantly increase the time of overall polymerization of the filling material, and also have a negative effect on the doctor's vision. Therefore, the best lamp for a dentist is a diode lamp.

Bibliography:

1. Andreeva A.V. MODERN PHOTOPOLYMERIZATION DEVICES // Scientific Review. Medical Sciences. - 2020. - No. 6. - P. 39-43.
2. Singh T.K. Journal of Orofacial Research "Light Curing Devices - A Clinical Review." T. 1. Issue 1. 2011. pp. 148-149.
3. Abbas N. Principles of using laser systems in dentistry // Dental market. 2005. No. 8. P. 7-8.