

# Laser in stomatology

## The use of laser in dentistry

Different types of laser are used in dentistry and their use is also different. Their main ones are:

1. **diode laser**
2. **erbium laser**

### Diode laser

- is used in :

- frenulectomy,
- plastics (vestibuloplastics, gingivoplastics),
- gingivectomy,
- therapy herpes simplex virus,
- canker sore therapy,
- diagnostics of dental caries.

A type of laser that is absorbed in tissues with a high content of blood pigment - **hemoglobin**. It is therefore used to treat **soft tissues** such as **gums, mucous membranes** or **skin**. However, it cannot remove tooth decay, but it helps us to find out where and at what stage the decay is located. It works at a wavelength of approximately **655 nm** and reaches up to 2 mm below the enamel, through which it penetrates with the help of a sensor that captures the reflected light beam and, based on the principle of laser fluorescence, we obtain information about the state of the dental tissue. Today, these lasers are commonly used in the world even in the form of a pen (Diode laser Diagnodent Pen ©), but in our normal practice (in the Czech Republic) they are still a novelty.

### Erbium laser

- is used in :

- preparation of dental caries (especially **classes I. and V.**),
- sterilization of the dental canal during endodontics,
- tartar removal,
- inflammation therapy.

Unlike the diode laser, it is best absorbed in **water-containing tissues**, such as **teeth** and **bones**. The wavelength of the beam is **2940 nm**. Since this wavelength borders the spectrum of visible light, the dental laser is equipped with a targeting beam source (semiconductor) whose wavelength is 670 nm. The energy emitted by this laser increases the temperature in the tissue by several 100 °C and the affected tissue is actually vaporized. This laser is used for non-contact **removal of tooth decay** or **calculus**. It can also be used **to sterilize** the dental canal or its use is used for **inflammation of the dental pulp**.

When removing tartar, the laser tip first searches for the tartar and the device evaluates its size. Accordingly, it will accurately calculate the dose to remove it. The size of the dose and the presence of tartar is shown on the display of the measuring device. The device sends laser beams only to places where tartar is present, simplifying and speeding up subsequent regeneration.

## Benefits

- the possibility of early detection of changes in the dental substance - the so-called enamel demineralization, which is the 1st stage of tooth decay,
- faster healing of wounds thanks to the sterilization properties of the laser,
- a smaller amount of anesthesia is often required,
- during laser preparation, the dentinal tubules remain open, so it is not necessary to etch the surface before filling with composite material,
- we do not find a Smear layer at the bottom of the prepared cavity,
- noiselessness during preparation,
- cavity decontamination.

## Disadvantages

- high purchase price of the device,
- devices weight,
- the need for intensive cooling during treatment (there is a risk of thermal damage to tissues (e.g. damage to the dental pulp during laser preparation of dental caries)).

# Links

## References

- MAZÁNEK, Jiří. *Zubní lékařství : Propedeutika*. 1. edition. Grada Publishing, 2014. 576 + 28 pp. ISBN 978-80-247-3534-4.

## Source

- BROUKAL, . *Strategie léčby / ošetření kazu* [přednáška k předmětu Kariologie, obor Zubní lékařství, 1. LF UK]. VFN. 20. 5. 2014.

## External links

- [www.zubni-lekar-zubar.cz/osetreni-zubu-laserem](http://zubni-lekar-zubar.cz/osetreni-zubu-laserem) (<http://zubni-lekar-zubar.cz/osetreni-zubu-laserem.htm>)