Faculty of Dentistry - First Year

Carbon Dioxide Gas Laser CO2

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First. Laser

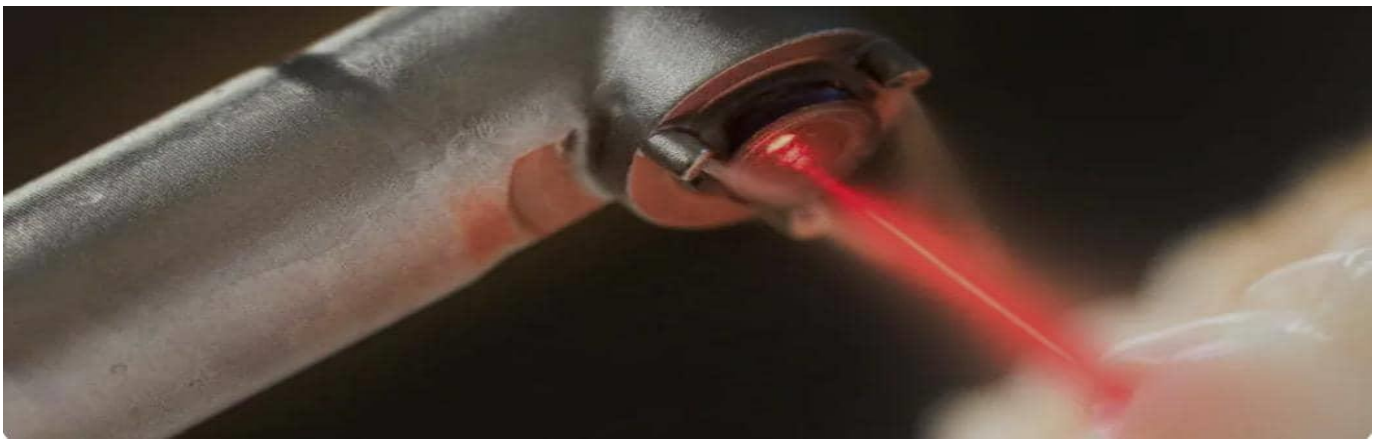
It is a device that emits light through the process of optical amplification that depends on the stimulated emission of electromagnetic radiation. Its photons are equal in frequency and identical in wave phase, as the waves interfere and may reinforce each other, which causes the light beam to be strengthened. The process of wave interference can be constructive interference between its waves to transform into a light pulse with a very coherent energy in time and space with a very small divergence angle. The first laser was built in 1960 by Theodore Harold Maiman at Hughes Research Laboratories based on the theoretical work done by Charles Hard Townes and Arthur Leonard Shallow.

Types of lasers:

1. Gas laser (carbon dioxide laser CO2, Excmier laser(

.2Semiconductor laser Diode laser

3. Liquid laser Dye laser.....



A picture showing the shape of a laser beam. By Back Machine website

Secondly, lasers in dentistry

In 1990, lasers began to be used in dentistry, in teeth whitening and gum treatment and it has become an integral part of this profession.

One of the most important types of lasers used is the gas laser (carbon dioxide gas laser). Carbon dioxide laser devices are one of the most powerful types of devices that work on the principle of continuous waves and are characterized by being highly effective. The active wave in them is a mixture of 3 gases: carbon dioxide, nitrogen, and helium. They produce a laser beam in the infrared range in which the wavelengths of the beam range from 9.4 to 10.6 micrometers .

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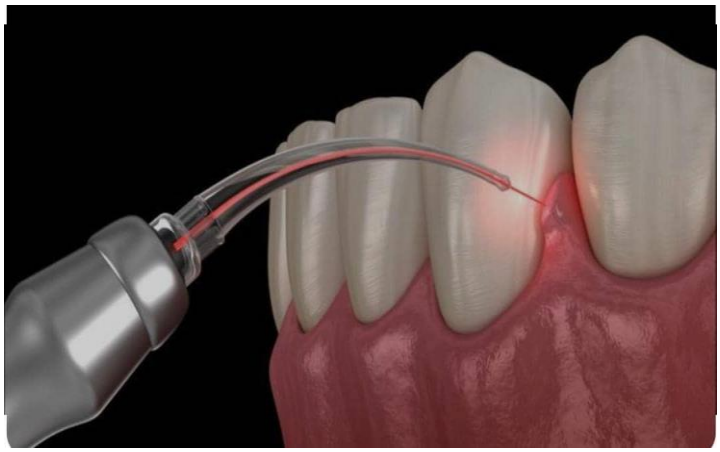
How does a carbon dioxide laser work?

It focuses on the treatment area with high precision, as it works to provide pulses of energy that form a small beam of continuous light. Its use is ideal in treating teeth and soft tissues, as it works as a cutting tool or tissue vaporizer, and while cutting the tissue, it closes the blood vessels in that area. It is also a sterilizer that eliminates all bacteria in the treatment area. During teeth whitening, it works as a heat source and improves the penetration of the bleaching material into the tooth tissue, ensuring faster results.



Why laser and CO2 laser specifically?

First. CO2 laser is the most common because of its adjustment capabilities and high accuracy.

Second. With laser beams, the patient is provided with treatment without needles or pain. The pain and swelling that we get after the laser are much less compared to regular surgery. And the healing process is faster. Especially in soft areas that need a long healing period and we have to wait. As for treating the gums with laser, we can immediately move to implanting the prosthesis, and this saves us a lot of time and makes the treatment faster and more fruitful. Also, the pain caused by the machines used in dental treatment is often due to the motors and severe vibration generated by these machines.

CO2 laser uses in dentistry...

.1It is usually used in complex gum surgeries (gingival resection and gingival resection) due to its high accuracy and its help in unifying the shape of the gums.

.2Removal of decayed tissues.

.3Cutting soft tissues and removing benign tumors.

.4Removal of infected and inflamed tissues in the mouth.

.5Disinfecting the tooth root nerve.

.6Soft tissue surgery.

.7Treatment of ulcers and treatment of salivary cell rupture that causes saliva to flow.

.8When taking a sample, it can cut small pieces of soft tissue for examination.

Advantages and disadvantages of CO2 laser treatment...

Advantages

.1The laser is very precise, thus reducing the damage caused by surgical procedures.

.2Reducing swelling and bleeding during and after the procedure.

.3Accelerating the healing process.

.4The laser is less painful during and after the procedure.

.5Reducing the level of fear and tension in patients who are afraid of dental tools such as drills.

Disadvantages

.1Water absorption: Due to the high water absorption, the CO2 laser can cause damage to healthy tissue if it is not used carefully.

.2Fire hazards: The CO2 laser may ignite flammable materials.

.3High temperature: The high temperature of the laser can cause it if it is not properly controlled

Safety and prevention measures during the use of CO2 laser...

1. Safety glasses: Glasses specially designed to filter infrared rays from CO2 laser must be worn by the dentist, medical staff and even the patient.

2. Laser beam blocking: All parts of the patient's body must be protected from laser rays by using a safety insulator specific to this type.

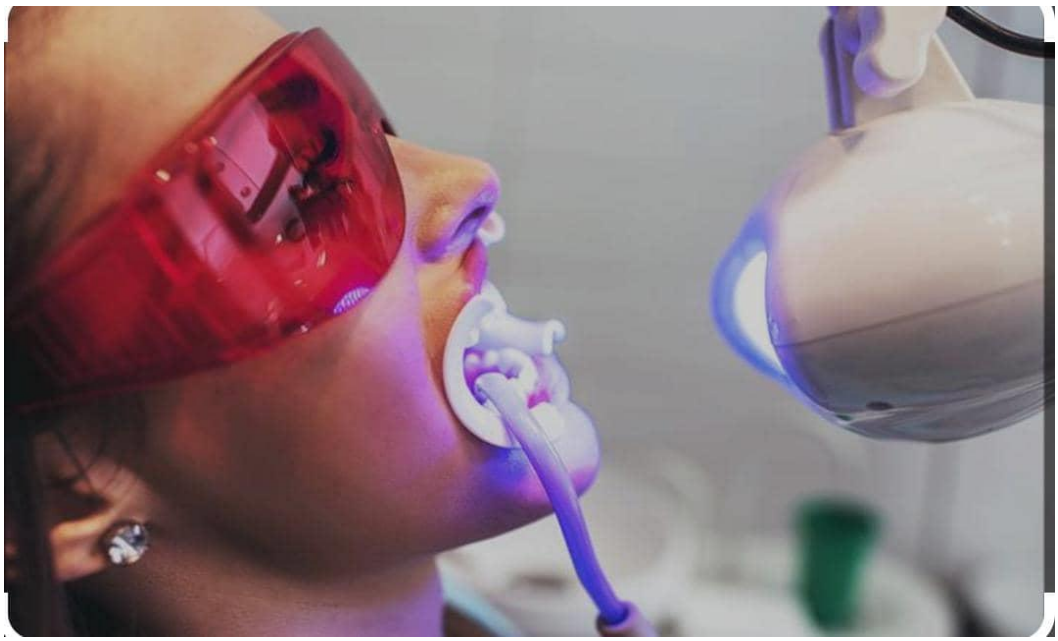
3. Tissue safety: Water must be used for cooling and protection from damage caused by the carbon laser. The dentist must use specific techniques to prevent damage caused by the laser. And determine the appropriate energy level for treatment so that no harm occurs.

4. Fire safety: Ensure that there is no flammable material such as paper, cotton and tissue paper. And monitor the temperature of the treated area carefully to prevent it from overheating. And provide a fire extinguisher in the work area.

5. Electrical safety: Ensure that all devices and all connections are intact. All carbon laser devices must be properly grounded to prevent electrocution. 6. General safety procedures: All medical staff must be familiar with the instructions for use and operating instructions, adhere to them, and receive continuous training on the techniques for using the carbon laser device..

Laser safety glasses

CO2 Laser Safety Insulator



A picture showing the use of safety procedures during treatment.

Tips to follow before using carbon laser:

1. Consult a doctor: Discuss with the doctor all aspects, including the patient's medical history, the medications he is taking, and his sensitivity to any substance. Medical history: Inform your dentist about any medical conditions you have, such as diabetes and autoimmune diseases.

.2Fasting: Your doctor may ask you to fast before the procedure, depending on the type of treatment.

.3Mouth preparation: such as cleaning your teeth well before the procedure.

.4Realistic expectations: Understand that results may vary from person to person and that the procedure may require other procedures.

After using the carbon laser:

.1Applying ice: Your dentist may ask you to put cold compresses on the treated area to reduce swelling and pain.

.2Painkillers: You may need painkillers, but you must follow your doctor's instructions carefully regarding the dosage and duration of use.

.3Avoiding certain foods: Your dentist may recommend avoiding hot, spicy and hard foods in the first days of treatment.

.4Quitting smoking.

.5Regular follow-up examinations to ensure that the area is healing properly.

.6Rest and constant hydration For the treated area.

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