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The Use of CO_2 Laser in Oral and Dental Medicine

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The use of CO_2 laser is a revolution in the world of dentistry because it has great benefits in this field. The CO_2 laser applications open the door for dentists to perform a wide range of dental and dental treatments faster and more efficiently. The dentists can use the CO_2 laser brilliantly in their treatments The daily merges exquisite and precise technology, science and art to provide better patient comfort and satisfaction with the treatment provided.

Laser CO_2: Basic Concepts

An introduction

In 1960, Theodoreman provided the world with a new light source with many advantages. On the one hand, it gives a ray of light more focused than the ordinary light, and on the other hand, despite its large concentration, it can be controlled with such precision that surgeons used it in fine eye surgery.

Basic Physical Concepts

At Boise's atom the electrons revolve around the nucleus in specific paths and each path enjoys a specific card.

The most stable electrons are closest to the nucleus. When electrons are induced, the electrons pass from the near path to the farther energy path.

When there are two levels of energy, thermodynamic laws dictate that the number of electrons at the level closest to the nucleus is greater than at the farthest. When this system is exposed to a light beam, the electrons located at the weakest (near) level and absorbed by the falling light move to the farthest level.

The return of the atom to its original state generates light radiation that releases the energy gained through the absorption of light.

The release of light is called spontaneously, the inflammatory atoms discourage each other independently. On the other hand, if several atoms can be induced in the basic state, a reflection of the number of electrons and light radiation occurs from another dominant nature, called the induced radiation. In it, under the effect of the photoreceptor, the various atoms are stimulated in an "inward" Direct photoreceptors or photons.

Laser components CO_2

The CO_2 laser is an amplifier of light. There are a large number of light-amplified spheres - the CO2 laser is a closed loop on each other through a photon of two parallel mirrors, forcing the photons to pass through the source. One of the mirrors is partially transparent, allowing the passage of part of the photons, giving a laser beam. The source is induced by an electrical current or projector. The beam mode is one of two types

1. A detailed arm consisting of several mirrors sequential and attached with a retractable grip
2. Flexible fiber optic, which leads to fold the power of the beam with a simple concave to the outgoing beam.

Physical variables

Power of the laser ..... energy / time = p and its unity watt
We distinguish two types of force - the external force of the machine
And the full strength of the machine
Energy density is the energy at a given time on a given surface
And its limit is JUL/cm2 ..... d = e.t / s

Styles

We distinguish 3-patterns:

1. **Continuous mode:** The force reaches its maximum and lasts with time.
2. **Pulsating mode:** Power is programmed within a specified time.
3. **Mode over the spring:** The force increases to reach the maximum and then gradually decreases. And the time is a thousandth of a second and has the benefit of the lack of high strength, which reduces the lack of complications on the tissue.

Focal Length

The distance between the place of the beam's exit and the place where it falls.

Effect on loose tissue: Surgery CO_2 blazer on oral pharyngeal mucosa was successfully applied by Jako in America and France in France in 1976. They demonstrated that the process of mucosal healing begins immediately after surgical intervention and that the blood vessels and lymph nodes have been blocked at the edges of the wound, resulting in a halt to hemorrhage. The absorption of water into the laser beam explains its concentrated effect leading to direct evaporation, which is determined by cell cutting at the soft tissue level. The removal of tissue in the oral cavity can occur by two techniques: cutting or evaporation. Depending on the technique used, we can obtain either a pigmentation or a cutting effect, combined with stopping bleeding in small vessels. These surface effects of laser CO_2 result from various thermal effects: - Stop bleeding resulting from the coagulation effect of small vessels.

The formulation is related to the evaporation process, while the cutting leads to precise edges of the wound.

The oral mucosa is heterogeneous thickness. For example, the back of the tongue appears because it is simply horned and contains a small amount of water, resistant to laser beam penetration. Its content of carbon is relatively large so the textile trapping is more noticeable. On the other hand, the bottom of the oral cavity, which contains a relatively large amount of water, reacts well with evaporation.

Indications of the use of CO_2 laser in oral surgery.

Laser CO_2 is the best oral condition for oral surgery used in:

- Free cutting
- Textile evaporation
- Stop bleeding in vessels less than 0.5 mm in diameter and is indicated in:

Al-Talwa

The nature of the lesion must be confirmed by biopsy prior to any surgical operation. The CO2 laser is used for 4 - 5 watts of continuous flocculation. The lesion with a diameter of less than 2 cm is treated in one session and the large or extended lesion is treated in several sessions.

After local anesthesia, the protocol provides the lesion of the lesion with successive strokes and then applies the lesion layer after layer until we reach the connective tissue. This method is quick and non-dripping and does not need to sew after surgery. There are no reversals in 90 - 95% of cases. After surgery, mouthwashes are prescribed and estrogenic and alcohol inhibitors are stopped to ensure successful work.

The goal of this surgery is to repair mucus problems in order to put the compensatory elements in perfect functional, mechanical and cosmetic conditions. With CO2 laser various interferences can be made accurately without backing for sewing. The height of the bone is insufficient leads to the instability of compensation and this calls for deepening the solution to solve this problem. Vestibular slide. Stretch along the top of the alnach from canine to canine. The fibroblastic neural tube is removed according to the desired depth and the peritoneum should be respected. The deepening of the gutter is always associated with a moving compensation situation adapted to the new maze. This technique is similar in cutting the mass. The bridle is tightened to locate its anchor and the evaporation process starts from its front fascia and extends to the depth of the bridle. When the formation is fibrous and bonded over the anemone, evaporation occurs on the fibrous edge and the beam is separated up to the peritoneal boundary.

Laser CO_2 in diseases of supporting tissues

(Cutting the gums, lengthening the crown, dragging a bronchial tube), under which there is a hyperplasia and stretching, and in the same session, without any bleeding to show the edges of the dental preparations and to find a suitable gummy shape to take the print.

When the elongation of crowns is indicated, the height of the bone can be reduced using a CO_2 laser. The histological vaporization of the bone is associated with carbon residues that must be removed during and after surgery and healing is rapid and homogeneous. The CO_2 laser can be used to pull a tubular shaft and facilitate the placement and adhesion of blockers because this technique prevents broad mucosal detachment, provides surgical comfort and stops rapid bleeding. Other types of laser, such as er: yag, l = 2.94 microns, are very effective in the area of surgery around the teeth, in addition to the sub-gingival and gingival cleansing. All studies have shown a suitable effect for cement (rough without cracks). And the effect of microbial killer on the bacterial colonies found in the sinuses around the teeth or in the proper mazes.

Laser CO_2 in gastrointestinal surgery

If traditional treatments are necessary, the CO_2 laser is complementary to the cranial surgery. The reprocessing must be done normally. Traditional treatment provides for the operation of a sigmoid mucosa, the cutting of a peak, or the scrape of a sack. The laser is used at this stage because of the accuracy of the beam that can reach places not reach the shovel and must remove all the tissue from the pit bone that has been sterilized. This applies to the ivory surface of the root of the root in the sacral fossa and to the removal of the lateral crowns. In melcer studies on 108 peak operations, radiotherapy tests showed a sufficient bone formation in 85% of cases

Laser wound healing CO_2

The CO_2 laser has been used in oral pharynx surgery successfully since 1976 and the mucosal healing process begins immediately after the overlap. The blood vessels and lymph nodes are blocked at the edges of the wound and produce a marked hemostatic effect if it is cut down by its strength, precision and concentration.

Benefits of using a laser

1. Sterilization of the work area sterility in the operational area.

   Laser provides precision and selectivity for its interaction with diseased tissue where it can.

   The doctor will reduce the amount of germs and other pathogenic organisms in the field.

   Surgical procedure when using laser.

2. Reduction of the incidence of bleeding reduction of incidence of bleeding.

   The laser is lower and reduces the need for the sewing procedure in the case of dealing with soft tissue.

   The main benefit of using laser surgery is to reduce the incidence of hemorrhagic complications and actually decrease blood loss. Some studies have indicated a 36% reduction in noses when laser is used in surgery.

3. Pain reduction of pain: The benefits of laser surgery have been compared to conventional surgery, such as reduced pain during and after work, decreased local anesthesia, and reduced effort on the surgeon due to lack of bleeding and time to close and sew the wound.

4. Effect of laser on healing wounds impact of laser on wound healing: When the laser is used in soft tissue surgery, healing is faster and scarring is less. After 7 days of surgery, the mucous tissue has been completely cured and there are no signs of edema or redness of the tissue.

Benefits of laser surgery laser surgery advantages

- Comfort.
- Absence of sound.
- Maintain the conditions of stature.
- Lose bleeding.
- Ability to evaluate the depth of the pieces.
- Cutting accuracy.

- Often do not need sewing or dressing.
- Decreased pain during and after surgery.
- Promote wound healing.
- Less scars.
- Use of a small amount of drug or dispense anesthesia

Laser wound properties

The use of laser scalpel in oral and maxillofacial surgery has characteristics that distinguish laser lesions:

- The act of styptic syrup He cuts bleeding and clotting blood vessels until the diameter of 0.5 mm.
- Relieve postoperative pain as a result of nerve endings and prevention of vandalism during surgery.
- A clean and sterile wound.
- Less edema because it reduces the possibility of contamination of the wound due to lack of contact between the wound and the instrument.
- Decrease the possibility of spreading blood and live polluting liquids.

He then discovered that both the CO2 laser and the ND: YAG laser were able to remove the soft tissue and stitch it perfectly.

Laser can be used in many treatments in dentistry

- Treatment of the sensitivity of teeth: The laser can be used to seal the ducts exposed in the area of the teeth, which causes severe and severe sensitivity in the teeth when drinking cold drinks or ice cream.
- Sterilization of the roots of the teeth: The laser has the property of sterilization so it can be used in the treatment of lesions of roots of the teeth and rotten teeth and dental abscesses.

Laser and soft tissue

The laser reacts with the tissue in a thermocouple reaction as the temperature of the target tissue increases. Whenever the laser is absorbable, the laser penetrates the soft tissue, seals the blood vessels and clots the nerve endings, thus reducing the bleeding and pain following laser surgery, limiting the use of analgesic drugs. Healing and healing faster according to laser energy used in surgery. Compared to conventional methods such as the normal scalpel and the equipment used in soft tissue surgery, such as electroplating, laser is the most flexible and most widely accepted tool in patients for its unique features in this field.

The following processors can be amplified using laser

- Treatment of gingivitis (inflamed red gums when brushing).
- Treatment of gingival sinuses formed around the teeth due to tissue regression supporting age.
- Scraping the gums and alleviating the movement of the teeth simple and medium result about gingival disease and around the tooth.
- Reshaping the boundaries of the irregular gums and beautify them to give clear boundaries and harmonious with the necks of teeth.
- Treatment of gingival gums (gums) caused by an increase in gingival tissue affected by gingivitis or taking some medications.
- Gynecomastia of a patient Calendar
- Gynecomastia

- Beautify the smile and improve the appearance of teeth, especially in people with gums smile, who show their gums when laughing or smiling.
- Lengthen the short crowns and rundown before compensation.
- Removal of uncomfortable soft tissue (textile folds) under the dental kit.
- Treatment of pigmentation dark gums or dark gums or dark gums, where the laser gives wonderful results for a beautiful pink gums.
- Obtain the tissue.
- Speech problems: In some patients the tongue is bound to be abnormal (the tongue tied), which causes problems of pronunciation. The laser can be used to change the position of the bridle, easily and without bleeding or pain.
- Cutting of the lip of the lower lip, which causes a gap between the folds and in conjunction with the orthodontic treatment can be eliminated from this vacuum must be the two treatments are combined to get the desired results.
- Treatment of dental abscesses and lactation and open and sterilized without pain As mentioned before laser seal of the nerve endings in the abscess area prevents the effect of the local anesthetic so the laser is effective and useful in such cases.
- Treatment of painful oral ulcers such as castles.
- Eradication of healthy tumors of the gums, cheek, tongue and lips.
- Fibromyalgia after surgery immediately after two weeks
- The second surgical stage of dental implants where the laser is used

To remove the gums and detect the implant and then complete the compensatory procedures.

Is the laser safe?

Laser devices have complete instructions on the safe use of laser. There are many basic principles that must be known before using laser.

Restores skin in laser wounds

Leeumann and his colleagues in 1987 proved that the re-formation of the skin in the wounds of the CO_2 laser was more delayed than in the cuts of the scalpel. In 1989, Cardos and his collaborators proved that the affected areas were only 100 microns deep from the special plate. Gamosec and his collaborators have demonstrated significant delays in wound reduction and skin formation in CO_2 laser wounds compared with grafted wounds. Because of the difference of opinion on this subject, a tissue and immuno-chemical study was conducted on the healing of laser wound CO_2 applied to the mucous membranes of the rats. After applying the laser directly to the mucus with 3 watts and a focal distance of 1 cm, it was observed that the edges of the skin, dermis and superficial part of the muscle fibers. After 24 hours, the ovulation of the eggs is rich in estrogen between the dead cells and extends deep. After 48 hours, the granular tissue and the absence of fiber generators are observed. On the third day note the emergence of fiber generators, which are especially located at the level of the edges and notes starting to form the skin from the edges. On the fourth and fifth day, it is noticed that several fibers remain in the depth of the lesion and the existence of large and long-form fibrous generators near the edges on the sixth day shows progress in the formation of the skin and the complete formation of the granular tissue and the wound becomes clean. In antibody-colored sections (anti-actin), we find fiber generators near the edges and are distributed parallel to the surface and take a protracted form.

On the seventh day, the skin increases in addition to the number of fiber generators. On the eighth and ninth day, the epidermis is almost complete and the same lipid generators are placed on the surface while other cells take the oval shape. On the tenth day the skin is formed. On the fourteenth day the skin is complete with a fibrous tissue in which the amount of cells is moderate. On the 22nd day, mucous membranes are normal.

Precautions to be taken when using a CO_2 laser

The dangers of CO_2 laser appear on the skin and eye in particular. The risks to the eye vary depending on the duration of application and the absorbed energy and may lead to permanent or temporary blindness. So you should: not consider the axis of the beam.

Removal of reflective surfaces

On the skin, the hands of the practitioner are exposed to radiation and the results of this are related to the strength and duration of the beam and the type of skin. With CO_2 laser you should pay attention to these burns.

Safety and safety standards

Safety standards at laser level

- Works with a key
- Alarm for radiation
- Push to pause button
- Power and frequency appear on the screen

Safety standards at the human level.

General protection

- Must have a stable and stable location
- Access to the clinic should be restricted to persons involved in the work
- Avoid reflections in places where we use the laser

Personal protection

- Protective glasses are used for this purpose and are ideal for anyone involved in surgery.
- For the patient the ideal protection is to cover the eyes to ensure proper protection.

Pros and cons of using CO_2 laser in oral surgery.

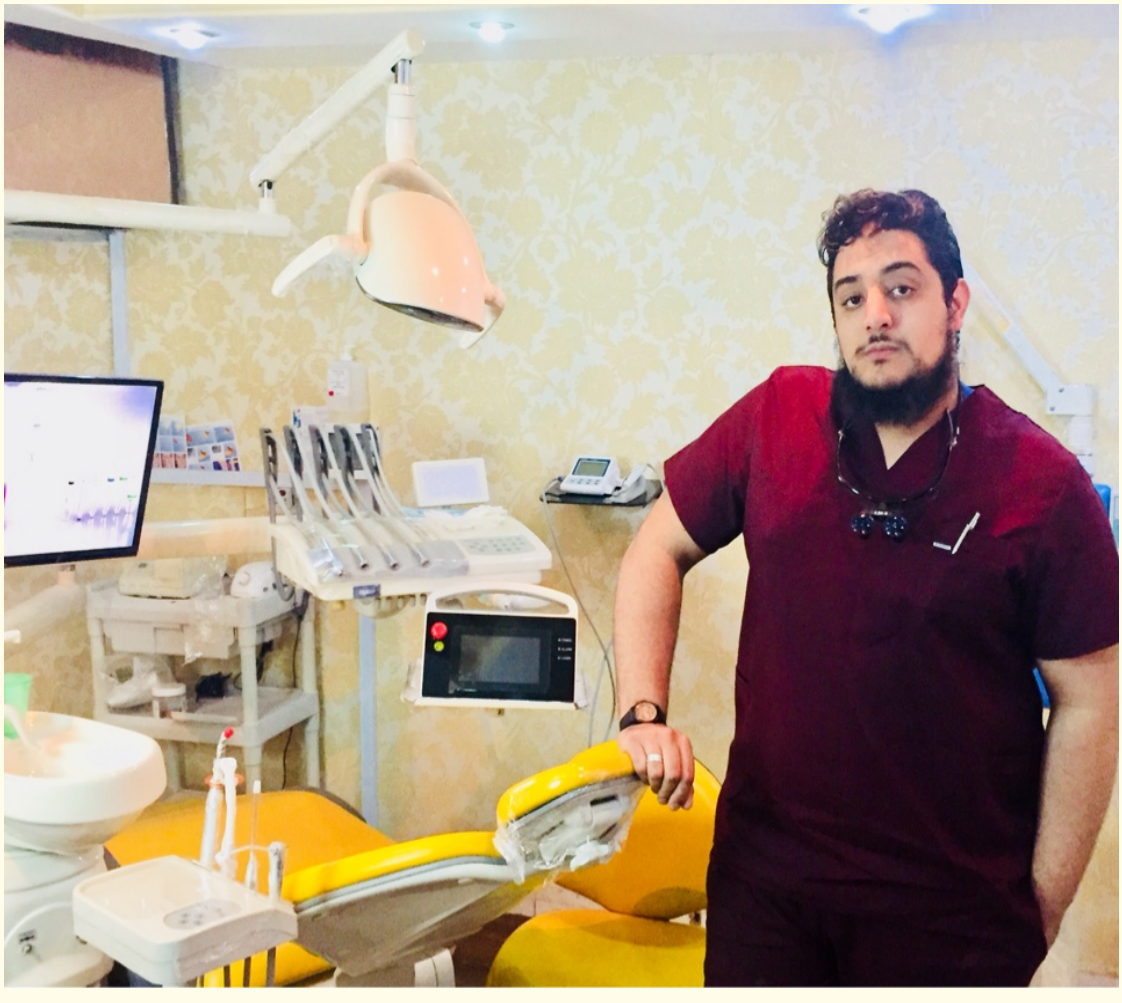
Beauties

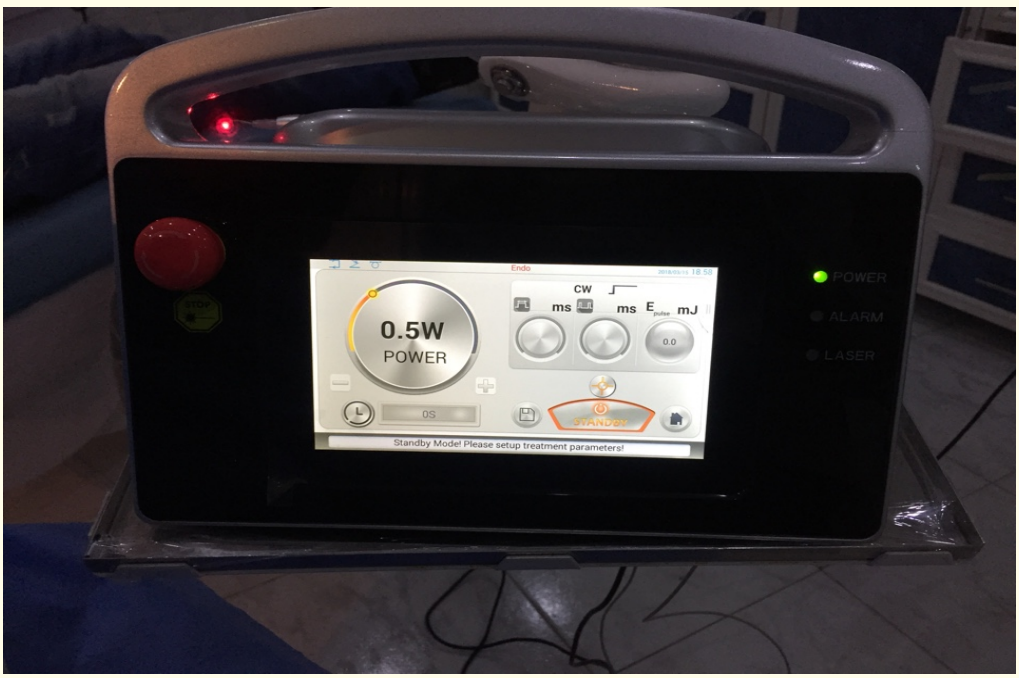
- Lack of mechanical contact, which allows cutting the tissue.
- Surgery without hemorrhage Surgery is always below the level of vision.
- Complete sin
- Work easier and faster
- No need for surgical pole
- Weak influence of radiation in the tissues

- Control the depth of work
- Complete healing

Disadvantages

- High price of the device
- An experienced surgeon
- Wounds should be placed under full control, especially in patients at risk (potential for subsequent infection).

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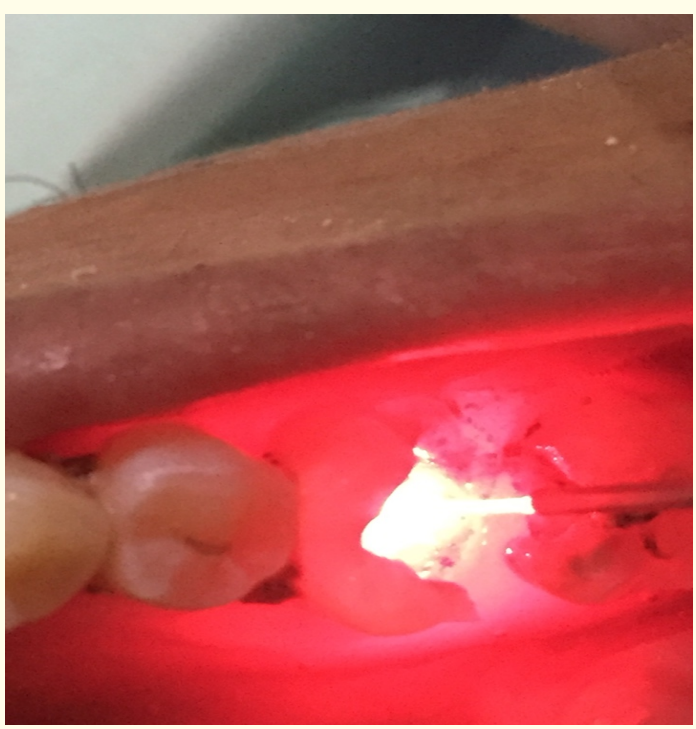

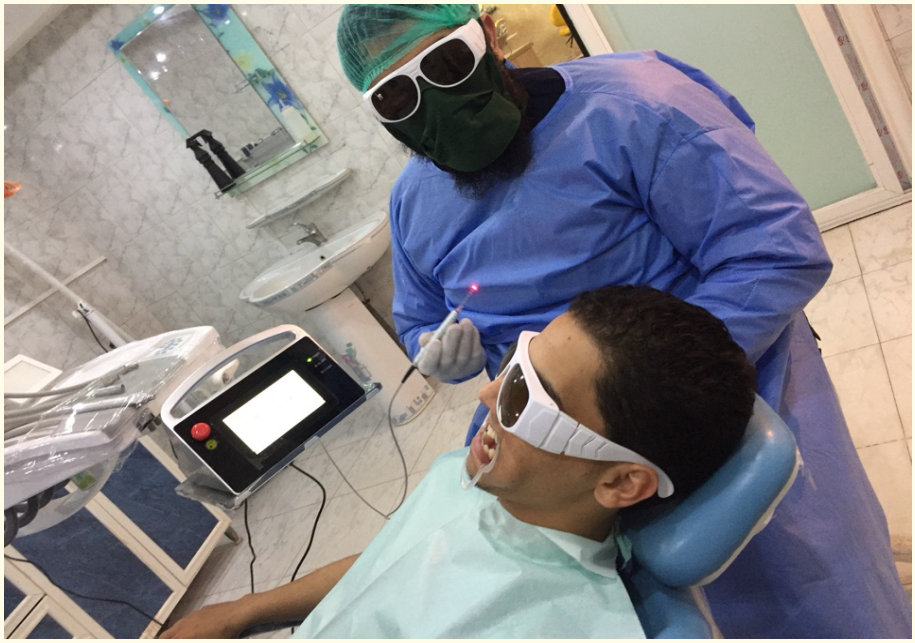

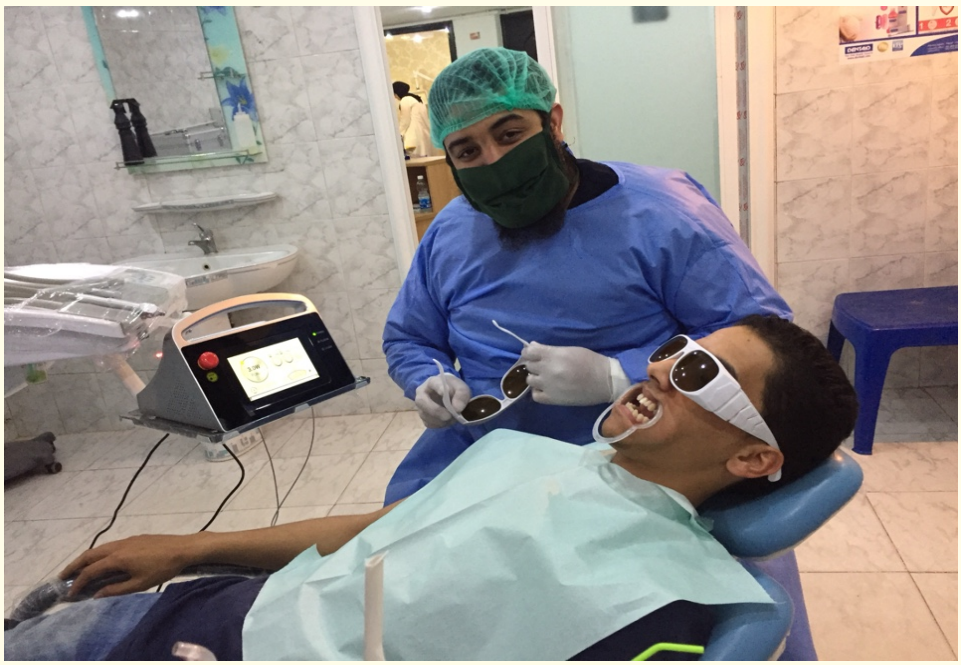

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