



THE DENTAL DIODE LASER



CLINICAL GUIDE

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BENEFITS OF THE DIODE LASER

Laser technology represents an evolution of medical techniques and an indispensable daily support to the traditional dental practice. The LITEMEDICS laser device is equipped with a series of pre-set programs, conforming to average settings certified by many scientific publications and collaborations with the prestigious Universities, with doctors and experts of the field.

- The extreme tolerability of the treatment can reduce the need for anaesthesia in most operations. This assures a better relationship with the patients, especially the odontophobic and children.
- The laser is a less invasive method compared with the conventional techniques, offering thus little cell destruction and little bleeding thanks to its haemostatic properties.
- The laser has a strong power against bacteria thus encouraging decontamination and anti-inflammatory action while using it.
- Treatment with the laser requires the patient a reduced number of sessions, and a shorter chair time for the most applications.

BENEFITS FOR THE DENTIST

- Practice growth and differentiation
- Precise incision, excision, ablation
- Quality of work
- Clean, clear operating field
- Reduced stress
- Greater through-put of patients
- Increment revenue
- Greater efficiency
- Fibre provides better access
- Visibility in oral cavity
- Versatile tool for several application

BENEFITS FOR PATIENTS

- Minimal or no bleeding
- No swelling, Faster healing
- Reduced post-operative infection
- Minimal or no anaesthesia
- Minimal pain, inconvenience
- Less time in chair, Less anxiety
- Whitening – single visit procedure
- High quality treatment
- Less time predictable result
- May be used in pregnant and pacemaker cases

LASER PARAMETERS

This brief explanation of the parameters involved in the diode laser will help the dentist approach and understand the benefits of laser assisted treatments

POWER: the amount of energy over time emitted by the laser. It is measured in Watts (W) 1 Watt equals 1 Joule per second.

MODE: two emission modes are used for dental lasers, continuous and pulsed.

CW, continuous wave mode refers to a laser which produces a continuous beam output. Fast in cutting procedures, has high haemostasis, but may create a little necrosis on tissue



Pulsed mode is a technique by which a laser produces peaks of power at short intervals of time. In the pulse mode, the average output power is lower than the peak of power proportionally to the duty cycle percentage. The most common Time On and Time Off is variable from 20µs up to 10ms. The pulsed mode is slower than CW in cutting procedures but avoids necrosis on tissue.



FREQUENCY: it is the measurement of the number of wave oscillations (pulses) per second. It is measured in Hertz (Hz)

TIME: application time for each single treatment.

The combination of the frequency and the Time On and Time Off characterizes the pulsed emission. It has two important clinical advantages:

- allows (during the time off) thermal relaxation and therefore no heat accumulation by the tissues.
- In micro-surgery there will be less use of anesthesia, avoiding inconveniences to the patient.

The LITEMEDICS laser features special pulsed modes with high peak-low average power modes that will cut cleanly and bloodlessly while limiting thermal damage.

PULSE MODE	T ON	T OFF
SP	10 ms	10 ms
PSP	30 µs	70 µs
SNP	500 µs	1000 µs
CW	continuous	continuous

LASING SUGGESTIONS

Activating the fibre:

Before starting, activate the fibre by switching on the laser beam and directing it for a few of seconds against a dark coloured scrap of paper.

Fibre Movement:

Hold the fibre perpendicular to the tissue, vaporise the mucus surface by moving the tip lightly around the required tissue area. Place the tip into direct contact with the required area and move back and forth over the tissue with rapid, decisive and regular movements. Should the patient feel any discomfort cool the operative area with the help of cold air. **Do not hold the fibre tip against the tissue zone for extensive time to avoid the risk of necrosis and superficial damaging.**

Always keep the fibre in movement during operation.

Cleaning the fibre:

Regularly clean the tip of the optical fibre by inserting it and rubbing it several times along a damp cotton swab to eliminate any carbon residue. This procedure ensures optimal power output.

IMPORTANT SAFETY PRECAUTIONS

Individual safety in the working area

The most dangerous hazard that can arise from a wrong application of laser light is damage to the retina if it is directed towards the eyes without the adequate protection. Doctor, patient, assistant and all others inside the operating room must wear appropriate laser eye protection for the diode laser.

Laser Plume Suction

Use suction as required to maintain a clear view during treatment. Special care must be taken to prevent infection from the laser plume generated by vaporization of virally or bacterially infected tissue.

Anaesthesia

In soft tissue cases anaesthesia may not be required, however patients should be closely monitored for signs of pain or discomfort at all times.

Operation area

LITEMEDICS laser is develop to remove soft tissues. Therefore always be aware of adjacent structures and substructures during treatments. Exercise extreme caution when using this laser in pockets or channels where critical structures could be damaged. Do not direct energy towards amalgam, gold or other metallic surfaces.

POSSIBLE SIDE EFFECTS

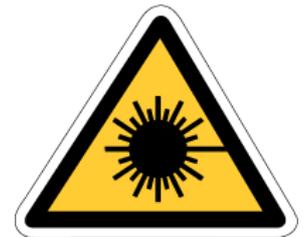
WARNING: The improper use of this laser device might lead to unwanted, sometimes dangerous effects.

The laser has many beneficial effects on human tissue given the correct values of power, frequency and application time. With high values of power and other inappropriate parameters it may though cause either undesired vaporization or necrosis in the radiated tissue.

Should necrosis be desired, as in cases such as photodynamic therapy or in the equivalent use of the scalpel, it will be unavoidable that along with the targeted tissue, the closest surrounding tissue might be damaged as well. The extent of such harm is essentially determined by the energy density provided to that tissue and exposure time. In many cases the harm will turn out as light and tolerable with respect to the benefit carried off.

The user should therefore very attentively check the following parameters, in order not to cause undesired effects on the patient:

- Power
- Diameter of the fibre
- Distance between the end of the fibre and the tissue spot
- Continuous or pulsed laser emission
- Application time



SAFETY TRAINING

Inappropriate use of the laser device may cause unwanted and sometimes dangerous consequences. To ensure that the laser equipment is used correctly and that all possible risks to health are properly addressed, it is necessary to provide clinic personnel with adequate safety training. An individual designated as the practice Laser Safety Officer (LSO) has the authority and responsibility to monitor and enforce the control of laser hazards and to evaluate and control the laser hazards present

In particular, the aim of the safety training given to employees is to ensure that all the people working in clinic with laser units are:

- competent in the operation and control of laser units
- aware of the health hazards that can arise from inappropriate or improper use of the equipment;
- understand the meaning of warning signs and other safety instructions;
- know how to use all the safety equipment provided.

TREATMENT INFO

ENDODONTICS

POWER: Avg 1.25 W- Peak 2.50 W

MODE: Pulsed – SP -

TIME: 5 s / Canal

FIBRE: 300 µm – Activated

ANESTHESIA: Not required



PROCEDURE:

After completing the traditional preparation of the canal, insert a paper cone lightly soaked with hypochlorite. Carefully measure the length of the canal and transfer the exact length to the optical fibre. The fibre should be inserted all the way (without activating the laser) to the top until 1mm from the apex.

1° Laser session

Start lasing with rotating movements in a clockwise direction towards the opening. After the first laser session, rinse the canal with a 10% citric acid solution. Leave the canal wet.

2° Laser session

Reinsert the fibre and again with rotating movements, but this time in an anticlockwise direction towards the opening.

After the second laser session, rinse the canal with hypochlorite.

3° Laser session

Repeat again the last laser session. The combination of laser with hypochlorite bring to a complete sterility and crystallisation with closure of the dentinal tubules of the canal.

Proceed with the closure of the canal using traditional methods. Remember that the laser can be used to cut and reheat the gutta-percha. Contact with the material could be at max 2-3 seconds to avoid elevated increases in temperature.

PERIODONTICS

POWER: Avg 1.25 W - Peak 2.50 W

MODE: Pulsed - PSP

TIME: 5 s /Canal

FIBRE: 300 μ m – Activated

ANESTHESIA: Not required



Record the depth of the pocket and evaluate its condition. Use the periodontal probe to define the height of contour desired. Prepare and fix the optical fibre 10mm out of the handpiece tip. Insert the tip of the optical fibre in the bottom of the periodontal pocket and then start firing by keeping the fibre parallel to the root surface. Pass the fibre both in vertical and horizontal directions covering both the epithelial surface and connective tissues. Vaporising the necrotized tissues eliminates the bacterial flora. Time by time, wipe off the stitch necrotic tissue from the edge of the fibre.

Each treatment takes 30" in the pocket and follow by an irrigation of hydrogen peroxide 3%/10Vol.

Repeat the same procedure in the pocket for three times. If the patient feels any pain increase the movements of the optical fibre. Laser offers a natural analgesic and biostimulating effects with a minimal post-operative discomfort for patients.

Therapy is terminated when there is a light continuous bleeding. The time required for the treatment depends on the extent and seriousness of the periodontal pathology. In average cases, offer the same procedure every 10 days for the first month and then once every 30 days for the following 5 months. Afterwards with the support of laser therapy it is possible to regenerate some of the tissues lost due to the infections.

THERAPY

POWER: 1 W

MODE: CW

TIME: 60 s / cm² - not in contact

FIBRE: 300 µm – Non-Activated

ANESTHESIA: Not required



APPLICATION: treatment of canker sores, herpetic and aphthous ulcers of the oral mucosa, biostimulation

PROCEDURE:

Begin the treatment aiming the top of the fibre perpendicularly to the skin lesion. Hold the fibre about 2/3 mm above the lesion.

Start lasing (not in contact) with circular movements from the outside (approx 1mm) edge of the lesion and move toward the centre.

Keep the fibre tip moving at all times as you move closer. After the first minute not in contact, brush the top of the fibre over the lesion and shoot with an interval of 5 seconds.

Contact must be light and quick until there is a visible change in the skin lesion. Use the air system during the entire procedure.

Once the treatment is over, the patient may advise pain or burning that will slowly and completely subside within about 5-10 minutes.

Repeat the procedure in 3 days if the condition doesn't improve and the pain is diminished.

Avoid the vermilion border whenever possible.

SURGERY

LITEMEDICS has three preset surgery treatment settings. HIGH, LOW and COAGULATION

COAGULATION

POWER: 2 W

MODE: CW

TIME: 5-10 s – brushing contact technique

FIBRE: 300 μ m – Activated

ANESTHESIA: Not required



PROCEDURE:

The haemostatic laser effect can be used to control haemorrhaging brought on in a traditional type operation.

Before beginning laser treatment, clean the wound and remove any excess blood. Place the fibre tip 2 mm above the wound, non-contact with tissue. Start lasing with small circular movements over the wound, with slight contacts. The time required for this operation will depend on the area of the tissue to be treated. Repeat again for 10 seconds if haemorrhage persists do not exceed 1.5 minutes of lasing.

If after several treatments the haemostatic effect has not been achieved, it is most likely due to a cut to the blood vessel of over 0.5 mm in diameter during the traditional operation. In this case haemostasis must be achieved using a different procedure.

SURGERY HIGH

POWER: Avg 3.50 W; Peak 7 W

MODE: Pulsed - SP

TIME: Free counter

FIBRE: 300 μm – Activated

ANESTHESIA: Topical /Local as needed



APPLICATION: fibrous connective tissue (FCT) that has relatively high tensile strength. Progressive fibrosis of the submucosal tissue; white in appearance, poor vascularized; exposure of unerupted teeth, fibroma removal, frenectomy and frenotomy, gingival troughing for crown impressions, gingivectomy and gingivoplasty, gingival incision and excision, Implant recovery, Incision and drainage of abscess, operculectomy, leukoplakia, oral papillectomies, reduction of gingival hypertrophy, soft tissue crown lengthening, vestibuloplasty.

PROCEDURE:

The high interaction between the wavelength of diode laser and the tissues containing pigments such as haemoglobin and melanin, gives a perfect haemostasis and a clear and visible operating area during surgery.

Keep the optical fibre perpendicular to the spot, direct the laser beam towards the tissue lasing it with forward and backward horizontal movements. Vaporize the mucous by keeping the fibre perpendicular and in direct contact with the surface.

Carry out the operation keeping the fibre in contact with the tissue using rapid, decisive and regular movements. Using this method the tissue is vaporised layer by layer. Cool the area using joint suction at a distance of 1-2 cm from the area to avoid dehydration of the tissue.

WARNING: for a quicker and more effective incision, regularly clean the tip of the optical fibre with a cotton swab.

SURGERY LOW

POWER: Avg 2.30 W; Peak 7 W

MODE: Pulsed - SNP

TIME: Free counter

FIBRE: 300 µm – Activated

ANESTHESIA: Topical /Local as needed



APPLICATION: all healthy tissue, in pink colour appearance; exposure of unerupted teeth, fibroma removal, frenectomy and frenotomy, gingival troughing for crown impressions, gingivectomy and gingivoplasty, gingival incision and excision, Implant recovery, Incision and drainage of abscess, operculectomy, leukoplakia, oral papillectomies, reduction of gingival hypertrophy, soft tissue crown lengthening, vestibuloplasty.

PROCEDURE:

The high interaction between the wavelength of diode laser and the tissues containing pigments such as haemoglobin and melanin, gives a perfect haemostasis and a clear and visible operating area during surgery.

Keep the optical fibre perpendicular to the spot, direct the laser beam towards the tissue lasing it with forward and backward horizontal movements. Vaporize the mucous by keeping the fibre perpendicular and in direct contact with the surface.

Carry out the operation keeping the fibre in contact with the tissue using rapid, decisive and regular movements. Using this method the tissue is vaporised layer by layer. Cool the area using joint suction at a distance of 1-2 cm from the area to avoid dehydration of the tissue.

WARNING: for a quicker and more effective incision, regularly clean the tip of the optical fibre with a cotton sponge.

WHITENING

POWER: 5 W

MODE: CW

TIME: 30 s / QUADRANT

FIBRE: Arch handpiece set

ANESTHESIA: Not required

PROCEDURE:



For this kind of procedure we suggest that a specific hydrogen peroxide gel designed for use with laser be used. Consult the product instructions for specific recommendations.

First of all, clean teeth with scaling and a flour pumice. Place cheek retractors. Measure and determine the actual colour grading of the patient.

Dry the operative zone. Apply the isolation dam onto the gingival area with isolation dam. Apply the whitening gel over all the frontal surface of the teeth with 2 mm thickness. Activate the gel holding the handpiece in close proximity (1mm - not in contact), respecting the built-in time control for each quadrant (30" each quadrant or as otherwise specified in the product instructions). Repeat the laser session for a second time with the same gel.

Leave the gel on the teeth surface for the time indicated on the gel instructions.

Wipe off the gel by suction and remove the isolation dam with tweezers. Rinse carefully from debris.

Determine the new colour grading of the patient and leave the advice to the patient to avoid staining liquid beverage and food.

If required, it is possible to proceed for a second cycle with a new gel just after the end of the first one.