Passion for Precision

Technical Data Iccy 810

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Model / Modell:	Iccy 810
Wavelength / Wellenlänge:	810 +/- 5nm
Operation Modes / Betriebsarten:	CW, Pulsed, Low-Level
Power / Ausgangsleistung:	0.5 - 7.0W, 10 - 100mW Low-Level
Pulse Width / Pulsdauer:	1ms – 1000ms
Interval / Intervall:	1ms – 1000ms
Laser Class / Laserklasse:	4
Pilot Beam / Pilotlaser:	635nm, < 1mW
Fiber / Faser:	200µm – 1000µm, F-SMA 905
Mains / Netzversorgung:	230V~/ 50Hz
Consumption / Leistungsaufnahme:	65W
Standards / Normen:	Directive 93/42/EEC
	EN 60601 / EN 60825
	CE 0482

Iccy 810

Dental Laser System

Alna-Medicalsystem GmbH
DIN EN ISO 13485 / DIN EN ISO 9001

CE 0482
Made in Germany

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Dental Diode-Laser-System Iccy 810

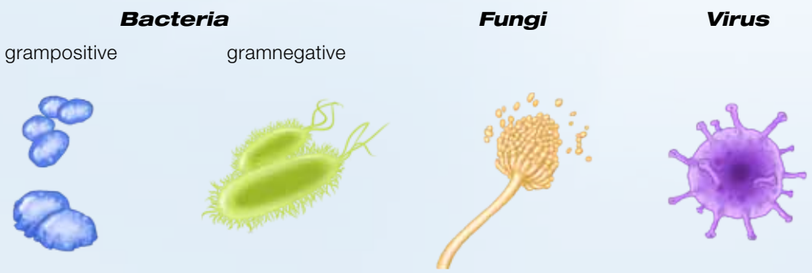
Antimicrobial Photodynamic Therapy - aPDT

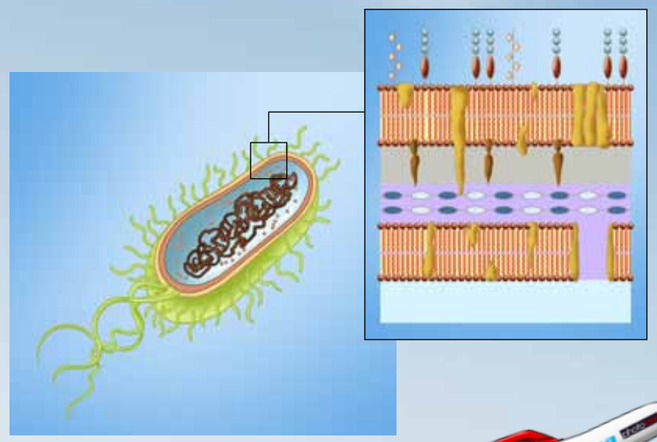
Iccy 810 – Cutting-Edge Technology

Resistance to the antibiotics among certain gram-negative bacteria is very prevalent which happens because of their additional outer membrane that protects them against antibiotics. This will result in ineffectiveness of conventional therapeutic methods. Antimicrobial photodynamic therapy is a cutting of the edge technology to solve this problem.

aPDT consists of three crucial elements:

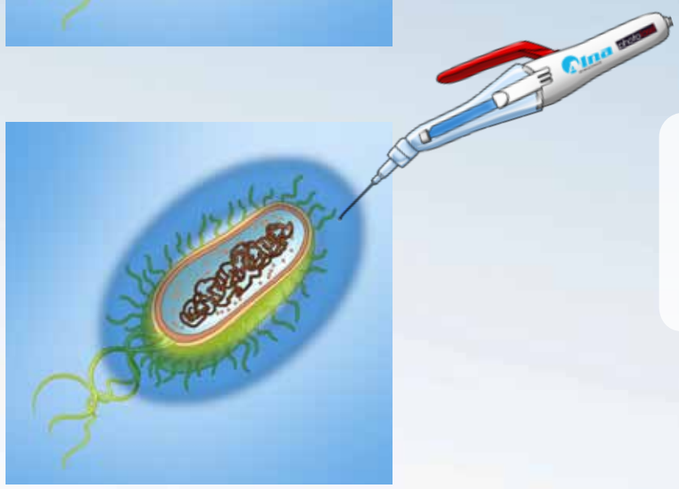
- Alna-Mediclasystem 810nm Laser beam
- Photolase® sensitizer
- Oxygen





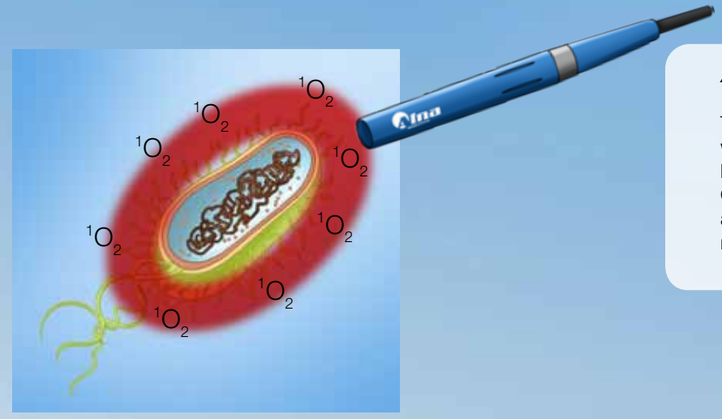
Cell-Membrane

The membrane of the bacteria consists of a phospholipid and lipopolysaccharide bilayer which its basic function is protecting the cell from its surroundings.



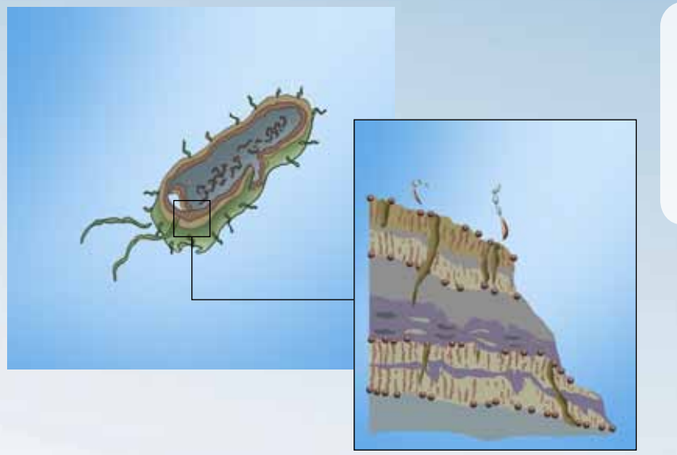
Sensitizer Application

The Photolase sensitizer is introduced to the target area. The sensitizer is highly soluble in lipids. As explained before, the infrastructure of the membrane of the bacteria consists of lipids.



Activating Oxygen

The Photolase sensitizer is irradiated with Alna-Medicalsystem 810nm laser beam. This reaction will produce singlet Oxygen ($^1O_2$) which is a highly reactive and causes oxidative damage in cell membrane.



99,99% mortification

The Alna-Medicalsystem photodynamic therapy using Photolase sensitizer is able to kill gram-negative and gram-positive bacteria as well as viruses and fungi.

Applications and Benefits

ENDODONTIA with mechanical preparation of the root canals (fig. 1-5)

There is an acute infection in and around the tooth. Root canal treatment can be completed in just one session using aPDT.

After mechanical preparation and cleaning with NaOCL and EDTA, the bare fiber is entered into the root canal. The thermal exposure time is 60 seconds for each canal. (fig. 2)

The Photolase sensitizer is brought into the canal with the application aid until the dye level on the pulp floor becomes visible (fig. 3).

The bare fiber is entered into the canal. The irradiation takes 40 seconds (fig. 4).

There is no need to rinse or dry the canal before filling, while, most sealers are compatible with the Photolase sensitizer. Using N2 or gutta-percha master points for instance, results in optimal compatibility (fig. 5).

ENDODONTIA without option of preparation (fig. 6-9)

There is an acute infection in and around the tooth, but the root canals are partially or completely obliterated.

An access cavity located near the former pulp cavity is created. Then a small cotton pellet is inserted in the entrance and filled with Photolase sensitizer. Afterwards, the coloring deposit will be irradiated without contact using Alna-Medicalsystem collimated handpiece. (fig. 7).

The entrance is temporarily closed with Cavit. Depending on the morphology and location of the canals, the sensitizer will penetrate into all micro-channels within 7-48 hours.
To ensure sufficient concentration of sensitizer in this region, it is often necessary to re-apply sensitizer three to four times at an interval of two to four days. Therefore, the access cavity must be reopened to renew the cotton pellet.
The clinical symptoms such as chewing or knocking sensitivity show clear remission after the 2nd to 3rd irradiation (fig. 8).

If there are no clinical symptoms exist, the access cavity is opened for the last time and instead of the cotton pellet, a mixture of Calxyl/sensitizer will be inserted into the cavity. Afterwards, it will be irradiated with the collimated handpiece and then closed with filling (fig. 9).

Applications and Benefits

PERIO and PERI-IMPLANTITIS THERAPY (fig. 10-14)

After pre-treatment with PTC, a plaque score under 30% should be achieved. Before the removal of sub-gingival concrement, the photodynamic therapy is performed to prevent unnecessary bacteremia. The process of coloring using the applicator is very precise. It is not necessary to penetrate to the base of the pockets. This can prevent unnecessary trauma and bleeding in the pocket. Blood destroys the sensitizer because it is linked to LDL proteins; therefore, it is no longer available for optical stimulation (protein error). The treatment is completely pain-free, thus, there is no need of anesthesia. Applying the sensitizer initially in two pockets of neighboring teeth is recommended (fig. 10). There are two options for irradiation:

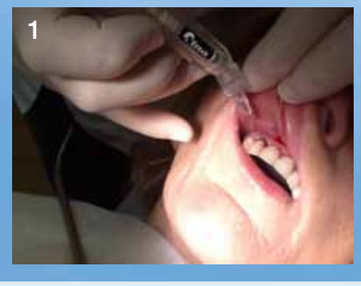
Intracanalicular: contact irradiation using bare fiber. The fiber is moved in a meander form from the vicinity of the fundus in the coronal direction, first in the buccal area and then in the lingual area, each for 30 seconds (fig. 11).

Extracanalicular: non-contact irradiation using the Alna-Medicalsystem collimated handpiece. The irradiation takes 40 seconds from the buccal area and 40 seconds from the oral area (fig. 12).

The extracanalicular irradiation is a better option. The main advantage of this method over intracanalicular irradiation is prevention of bleeding during the procedure. Furthermore, the high penetration depth of wavelength of 810 nm into the biological tissue (optical window) is totally utilized. To prevent the rapid re-colonization of pathogenic bacteria in the mouth, the full mouth disinfection is necessary; even though only individual pockets require treatment. After the first irradiation cycle of all quadrants, the minimally-invasive removal of concrement can be performed in the same session. Next treatment session will be performed in the following 4 to 7 days and the third session will take place in the same order. The treatment sequence corresponds to turnover of the bacterial population.

The described procedures are also valid for peri-implantitis (fig. 14).

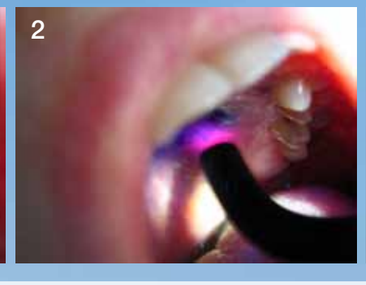
Clinical examples of aPDT



1. Applying the Photolase sensitizer using the applicator.

2. Non-contact Irradiation with Alna-Medicalsystem 810 nm laser beam using collimated handpiece.

3. Oral bacteria and viruses are eliminated.



1. Applying the Photolase sensitizer to the infected region.

2. Non-contact Irradiation with Alna-Medicalsystem 810 nm laser beam using collimated handpiece.

3. The fungal infection is treated.

1. Applying the Photolase sensitizer to the infected region.

2. The infection is treated.