PHOTOREJUVENATION BY PDT THROUGH A NEW LED 633nm TECHNIQUE
YOUNG AGAIN® TECHNOLOGY – EPIC PLUS DEVICE

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INTRODUCTION

- The field cancerization concept in photodamaged patients suggests that the entire sun-exposed surface of the skin has an increased risk for the development of pre-malignant lesions, mainly epithelial tumors (1).

- Patients with photodamaged skin need guidance in selecting treatment plans that optimize outcomes, minimize down time and reduce adverse effects.

- Photodinamic therapy (PDT) with 5-aminolevulinic acid (5-ALA) is a new treatment for photodamaged skin (2).
Photodynamic therapy is a modern non-invasive method that uses a photosensitizing substance applied topically, which, activated by visible light at suitable wavelengths, determines the selective apoptosis of altered cells.

Approved by FDA in 1999 for actinic keratosis and basal cell epitheliomas, in recent years the growing use of this technique has demonstrated its efficacy for the treatment of other diseases, from acne to warts and photorejuvenation.

Photodynamic therapy (PDT) has shown to be effective in the treatment and prevention of non-melanoma skin cancer. PDT is also established as treatment modality for several non oncologic indications. The aesthetic effects of PDT for photoaged skin are well documented. An improvement of lentigines, skin roughness, and fine wrinkles was demonstrated (3).

Field cancerization is a term that describes the presence of genetic abnormalities in a tissue chronically exposed to a carcinogen. These abnormalities are responsible for the presence of multiple non-melanoma skin cancer, its precursors, actinic keratoses and dysplastic keratinocytes in sun exposed areas. The multiplicity of the lesions and the extent of the area influence the treatment decision (4).
YOUNG AGAIN®: Exclusive and Patented features

HIGH POWER EMISSION IN CONTINUOUS MODE AND IN INTERMITTENT MODE

> 100 mW

Non-melanoma primary skin cancer is the most common malignancy affecting man (White, 1992), and the skin is also a frequent site of metastatic spread. Photodynamic therapy has been investigated as a new modality for the treatment of both primary and secondary skin cancer. This form of therapy uses a combination of photosensitiser, light and oxygen to kill tumour cells (Moan & Berg, 1992).
The technique is based on a photodynamic reaction, chemical process mediated by light, with light absorption by a photosensitive substance and subsequent formation of ROS. The photosensitising substance is the 5-ALA (5-aminolevulinic acid) a molecule non-toxic to humans, small in size, the intermediate product of the synthesis of protoporphyrin IX.

The PDT uses different wavelengths in the visible spectrum, depending on the target.

The PDT is a non-invasive method that uses a photosensitizing substance topically and a source of light energy in order to induce the selective apoptosis of cancer cells or atypical through photophysical, photochemical and photobiological events.

The photosensitiser is selectively concentrated in tumors of epithelial origin in numerous dermatological lesions due to the metabolic characteristics of pathological tissue. Within the mitochondria of the cell altered, the molecule is rapidly metabolized into protoporphyrin IX, which is the true photosensitizer.
The exposure to a light source activates substance and generates those photophysical, photochemical and photobiological phenomena that determine death by necrosis or apoptosis of cells sensitized. The reaction is limited to the damaged tissue, allowing a highly selective treatment. The photosensitizer easily penetrates through the altered corneum.

The wavelength used is 624 nm red light which reaches to the deep derma.

The ALA cream is placed on the target about one hour before treatment. Exposure to the light source is fairly short, it takes 10-15 minutes depending on the lesion. The following days will be the formation of scabs and slight scaling. It’s advisable to use an antibiotic cream for a few days and sun protection.

In our Clinic we are using, with encouraging results, the wavelength in the red at 624 nm, for the treatment of actinic keratoses and for the rejuvenation. This is a particularly innovative method, not only because it uses high-power LEDs (>100Mw/cm²), but mainly because, by acting at a distance from the tissues (about 5-10 mm), ensures no loss of energy.
YOUNG AGAIN® is the **only technology** in which the benefits of light and heat **are exploited at 100%**; working at a minimal distance (5-10 mm), tissues receive all the energy emitted **without any dispersion**.
How does YOUNG AGAIN® work?

Cells stimulated by the exclusive YOUNG AGAIN® technology, are different according to the wavelength used. Higher wavelength corresponds to deeper penetration of light energy.
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[Diagram showing various features including Young Again LED, High Power LED, LED, Collimated Laser Module, Dispersion Laser Module, Follicles, Tissue, and Scalp.]
We selected 30 patients, with wrinkles of type III-IV according to the classification of Glogau. We administered 5-ALA to 5% cream for about two hours with occlusive bandage. We subsequently irradiated with LED light at 633 nm for 15 minutes with pulsed technique. The equipment we use is the only one to provide for an irradiation at about 10 mm from the skin.

This characteristic makes it particularly effective as it allows not to waste energy and to work at relatively low powers, hence to improve the perception of painful sensation by the patient. At the end of treatment the patients had erythematous skin.
They were sent home with anti-inflammatory creams and emollients. The check-up visit after 3 months showed a significant decrease of the roughness and the overall improvement of the texture. Treatment may be repeated.

These results are particularly encouraging because PDT can complement other anti-aging treatments, but mainly because it could represent a valuable tool in the treatment of precancerous lesions and in preventing the onset of these.

The technique used is the only PDT patented in which the distance between the skin and the LED does not exceed 10 mm, this optimizes the absorption by the altered cells, reducing the time of exposure and encouraging patient compliance.
Roughness under 2.5mm of lateral size

- 100%
- 64.6%
1) Szemies RM et Al, Clinical, histopathological and immunohistochemical assessment of human skin field cancerization before and after photodynamic therapy; Br J Dermatol, 2012 Feb

2) Shamban AT, Current and new treatments of photodamaged skin; Facial Plast Surg, 2009 Dec;25(5):337-46

3) Kohl E., Karrer S., Photodynamic therapy for photorejuvenation and non-oncologic indications: overview and update; G Ital dermatol Venereol, 2011 Dec; 146(6):473-85