
New approach to non ablative wrinkle treatment – Combination of conducted RF and laser

Case Report

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Introduction

The clinical signs of aging include increased visible vascularity, actinic keratosis and skin wrinkling. Depending on the dominant problem, there is a different technology that addresses each of these undesirable conditions. For moderate to severe wrinkling, the greatest improvement has resulted from surgical or ablative techniques such as laser and chemical therapy. However, patients have avoided such modalities because of the associated morbidity.

There are non-ablative devices that address the problem of skin wrinkling. One technology is based on light absorption by water with simultaneous cooling of the skin surface. Currently, the most popular products in this group are the 1.32 μ Nd:Yag, and 1.440 μ diode lasers. Collagen remodeling occurs in part from a heating of the collagen fibers to a sub-necrotic level. The main limitation of these devices is that multiple treatments are required and wrinkle reduction is minimal compared to the ablative techniques.

The second group of devices is based on creating peri-vascular inflammation secondary to gently heating the skin and possibly increasing blood supply to the treated area and resultant change in skin metabolism. Examples of this technology are the pulsed dye and 1064 nm Nd:Yag laser. Promising results with this technology have been shown with peri-orbital and perioral wrinkle reduction. However, the treatment effect of the pulsed dye laser is limited by the shallow penetration depth which is about 0.5mm. The 1064nm Nd:Yag laser has a greater penetration depth, of about 4 mm, but absorption of this light energy by hemoglobin is not high. Thus, while such therapies address some of the issues with non-ablative therapy, other options maybe more efficacious.

This case report is to present preliminary results from the Polaris WR by Syneron Medical Ltd. utilizing ELOS (Electro-Optical Synergy). This technology may afford patients with greater wrinkle reduction than current non ablative devices. In addition, these results

were obtained with out the recovery process of ablative techniques.

Polaris WR technology

The Polaris WR is a device that combines two forms of energies – laser light energy (optical) and conducted radio-frequency (RF) energy, simultaneously applied to the tissue. The premise is that the RF energy will penetrate into the skin and cause heating of the deeper tissue with neo-collagen formation while the laser energy will be synergistic with this effect and also address the more superficial problems of unwanted pigmentation and visible vascularity. Conceptually, the two energy sources will provide greater wrinkle reduction and eliminate undesirable pigmentation and vascularity with out epidermal injury.

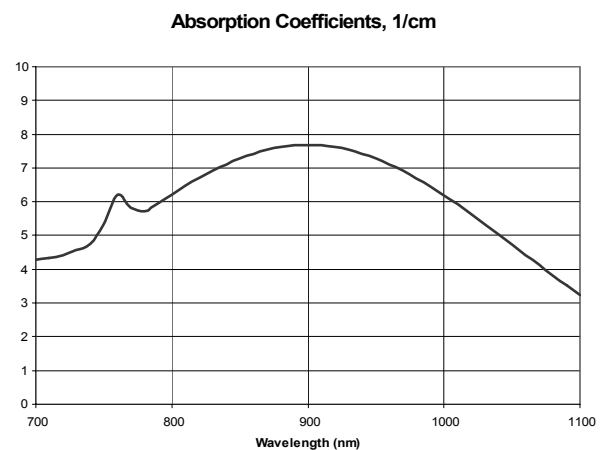


Figure 1. Light absorption by hemoglobin as a function of wavelength.

Optical properties of the Polaris WR: Optical energy is produced by a diode laser generated light at 900nm. This wavelength corresponds to the peak of hemoglobin absorption and has a penetration depth of more than 2mm. Light absorption by the hemoglobin is

shown in Fig.1. Optical energy density can go as high as 50 J/cm² with pulse duration as long as 200 msec.

Conducted RF properties of the Polaris WR: The Polaris WR can generate RF energy level as high as 100 J/cm³ with a pulse duration up to 200 msec. Conducted RF is delivered to the skin by a bipolar system that provides a penetration depth of approximately 2mm.

The hand piece is designed to optimize the temperature distribution so that there is maximal effect in the deep dermis. Other parameters of the delivery system that are controlled include cooling and pulse duration to facilitate the treatment of all skin types with the same efficiency.

It is known that due to high scattering, the maximal effect of light fluence is on the skin surface at the area of contact between the hand-piece and skin. Maximal RF current is also in the area of the skin between the two contacting electrodes. The design of the Polaris WR hand piece creates an overlap of these two forms of energy inside the tissue at depths of 1-2 mm while on the skin surface, the energies are separated spatially. Therefore, examining initial in-vitro studies, the clinical effect of Polaris WR on tissue was greatest at a depth of 1-2mm causing matrix coagulation of deep dermis with RF and selective thermolysis of blood vessel with the 900nm diode laser.

Case Reports

Case #1:

80-y/o woman with significant wrinkling, undesirable pigment and vascularity was treated. Because of her health and financial condition, she did not want a surgical treatment.



Figure 2: Left Before, right one month after three Polaris WR treatments.

There were no other modalities provided her, i.e., Retin-A, Botox, superficial peels, etc. She has improvement of all three of the “signs” of aging.

Following each treatment, she had mild swelling for 1-2 days. The recovery process did not compromise her normal activities.

Case #2:

57-y/o woman who has significant skin wrinkling. She has undesirable vascularity and hyper-pigmentation of



the skin but to a lesser degree than the previous patient.

Figure 3: Left Before, right one month after three Polaris WR treatments.

Her recovery process was similar to the other patient.

Discussion

The results obtained with the Polaris WR are encouraging. The early post treatment results demonstrate significant reduction in the signs of aging. Improvement of the wrinkles in these cases is dramatic and from my experience, is equivalent to laser resurfacing. Patients with both significant and minimal to moderate hyper-pigmentation and hyper-vascularity were improved. Lack of complications and minimal downtime place this device in the non-ablative category. The major patient concern was the discomfort associated with the treatment. Long-term follow-up will determine the lasting effect of this technology and if additional treatments will be necessary to maintain these initial results. Efforts are underway to optimize the treatment parameters in order to improve patient comfort, results, as well as examine the effect on all skin types.