Silk’n™ Reju - Home Use Novel Device Using LED Therapy for Facial Rejuvenation

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Abstract

Facial skin rejuvenation results of a portable home use device, Silk’n Reju (Home Skinovations, Yokneam Illit, Israel), are reported in this study. The device combines low energy Light Emitting Diodes (LED) non-thermal technology with mild contact heating. The combined energies are termed Home Fractional (HF) technology. Twenty females aged 30-55 were enrolled into the study, and used the device on a bi-weekly basis for 8 weeks. Each of the study participants underwent informed consent and performed self-treatments at the clinic supervised by an experienced nurse. Results assessment was carried out by blinded reviewer one month post treatment. Results showed marked improvement of 60% in the reduction of fine peri-orbital and peri-oral wrinkles. In addition, 65% reduction in pores size, as well as 45% improvement in brown spots was noted.

Introduction

Skin rejuvenation is a general term for improving the appearance of the facial, neck, decollate and hand skin. The skin appears younger and healthier with fewer fine wrinkles, smaller pores size, and less brown and red spots.

Photorejuvenation has been widely addressed by non-ablative thermal technologies, such as lasers and intense pulsed light. The mechanism of these technologies termed photothermolysis [1], involves a selective absorption of photon-based energy by chromophores, causing heat injury to the lesions. At the same time the wound healing induced cascade results in collagen remodeling.

Alternatively, a non-thermal technology using Light Emitting Diodes (LED) has been widely used in the last 10 years for skin rejuvenation to improve aging signs.

Low energy LED light mechanism is termed photomodulation [2] and is based on up and down regulation of cell activity through the effect on mitochondrial gene expression.

The use of LED for stimulating cell growth has been theorized for plant cell growth and wound healing [3]. Further studies have shown that LED light can modulate fibroblast activity [2] in correlation with changes in human skin [4].

A skin rejuvenation effect was reported, using a novel model of non-thermal stimulation of cells. Low energy, narrow band LED emitting dominantly at 590nm was noted to have beneficial effects for common lesions of photo-aged skin [5].

Available light-based and LED-based devices demonstrate results with significant efficacy and a high degree of safety. However, to achieve these results, the medical conduction in-office is essential.
The major limitation of an in-office procedure is the total number of treatment sessions that may be as high as 16 and requires the patient to make appointments and travel to the physician office.

Skin rejuvenation procedure is very tempting to be performed at home, especially when using a safe type and range of energy that requires multiple treatment sessions. Therefore, we have produced a home use device to address facial skin lesions such as fine wrinkles, large pores, and brown spots.

A combination of LED non-thermal technology with heat radiation was used in the home use device in order to achieve a high degree of efficacy and safety.

**Study Objective**

The objective of this study was to assess the clinical efficacy, safety and patient tolerance for the LED device, Silk’n Reju, (Home Skinovations, Yokneam Illit, Israel).

**Materials and Methods**

**The Silk’n™ Reju Device Specifications**

The device is a small, light weight, portable, low cost, LED system (Figure 1), using the Home Fractional (HF™) technology through a matrix of 24 LEDs. It has the following specifications:

- Wavelengths: Dominantly 635 nm
- Power density: 500 mW/cm²
- Spot Size: 5 cm²
- Continues operation with skin surface temperature cut-off at 41°C.

**Patients**

Twenty patients were selected for this efficacy and safety study. All patients were females with an average age of 41 years old. All participants used the Silk’n Reju on their faces for treatment of fine peri-oral and peri-orbital wrinkles, large pores and brown spots. Various skin types were treated - II (8 subjects), III (7 subjects), and IV (5 subjects).

Informed Consents were obtained from all study participants. The patients did not use topical anesthetic cream during the study.

**Treatment Technique and Protocol**

The protocol involved 16 treatments (twice a week for 8 weeks) of 20-30 minutes for both facial sides, depending on
treated area size. During each treatment session, the participant used the Silk’n Reju by placing it on the face skin and gently moving it in different zones - around the eyes, on the cheeks and around the mouth. Each zone was treated for 5-7 minutes until the desired skin surface temperature was achieved.

The participants used the Silk’n Reju facial moisturizer cream supplied with the device following each treatment.

The investigator took standardized front and profile close up facial photos of the study participants. Photographs were taken pre-treatment, and at the follow-up visit of one month after the last treatment.

Photographs were examined by a blinded, independent dermatologist observer, experienced in facial rejuvenation treatments. All photographs were evaluated and graded for each zone for the change of fine wrinkles, pores size, and brown spots.

**Results**

Wrinkle improvement, pore size reduction and brown spot clearance, were estimated based on the blinded evaluator by comparing the before photographs to the after ones.

The one month post treatment average results of all participants showed marked improvement of 60% in the improvement of fine peri-orbital and peri-oral wrinkles, 65% reduction in pores size, as well as 45% clearance in the brown spots.

95% of study subjects experienced wrinkle and pores size improvement at the follow up session. 75% experienced clearance in brown spots.

![Figure 2. Silk’n Reju facial rejuvenation results.](image)

**Figure 2. Silk’n Reju facial rejuvenation results.**

*Upper: before. Lower: 1 month post 16 treatments*
Figure 2 shows a typical Silk’n Reju facial rejuvenation results.

Complications
There were no complications in the study.

Discussion

The worldwide market of anti-aging creams for facial rejuvenation is estimated to be approximately US$ 13.6 billion. The worldwide market of in-office medical laser and RF based devices for facial rejuvenation is currently estimated as US$ 2.5 billion dollars per year. These treatments offer a good retail proposition for improvement of facial skin, but are rather costly.

The Silk’n Reju system is a low cost device that may be used at home for patient’s convenience. Being light weight, portable, ergonomic, easy to operate, and well tolerated, make the device highly acceptable for home use.

The home device using the HF™ technology has proven to be clinically effective at improving the appearance of aged and photo-damaged facial skin. Common lesions of fine wrinkles, large pores and brown spots showed a high degree of improvement by 60%, 65%, and 45%, respectively.

The efficacy of the Silk’n Reju may be explained by its dual use of energies. The low optical energy, non-thermal LED may contribute to increased collagen mass by inhibiting its degradation down to the deep dermis [6]. This will be manifested as improved wrinkles and pores size. The optical energy of 635 nm along with the superficial penetration of the heat radiation may heat the epidermis and render the brown spots more fragile. The contact heating may also help in collagen contraction.

The safety of the Silk’n Reju is due to the low energy LED on the one hand and to the safety limit of cut-off temperature of the contact heating, on the other hand.

The Silk’n Reju has similar technology characteristics of professional in-office, high fluence, medical grade devices. At the same time, the system displays a high degree of safety with no complications, which is a crucial feature for a home use device.

References