A NEW LIGHTENING APPROACH TO ACNE TREATMENT - COMBINING THERAPY MODALITIES FOR MAXIMIZING ACNE TREATMENT: PHOTOTHERAPY (LHE™), DRUGS, SKIN REJUVENATION AND SKIN TIGHTENING

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Background: Combination therapies are increasingly being used for the treatment of acne.

Objective: 2 years of clinical experience using a combination of drugs with LHE™ phototherapy on moderate to severe acne patients.

Methods: Patients first underwent a series of 8-10 bi-weekly LHE treatments to reduce their dermal inflammatory process. These treatments were combined with keratolytic agents which are not contraindicated with phototherapy. The combined LHE/drug treatment regimen was followed by a series of LHE skin rejuvenation procedures to treat post acne symptoms of localized erythema, post inflammatory hyperpigmentation and scars.

Conclusions: This double phototherapy protocol appears to offer excellent clinical and aesthetic results with no side effects or complications and may be repeated if relapse occurs.

Introduction

Acne vulgaris is a common skin disease, affecting 80-85% of adolescents and young adults. The pathogenesis of acne vulgaris is multifactorial. Four key factors are responsible for the development of an acne lesion; follicular epidermal hyperproliferation with subsequent plugging of the follicle, excess sebum production, the presence and activity of Propionibacterium acnes, and inflammation. If not treated acne can cause physical pain and psychosocial suffering and can lead to scarring. Treatment is directed towards the known pathogenic factors involved in acne and is determined based on the grade and severity of the acne. Combination therapies using agents with complementary mechanisms of action are increasingly recognized as an effective strategy for treating acne. 1-3)

Drug treatments are administered topically or systemically. Topical treatments include retinoids which cause epidermal differentiation and thus normalize follicular hyperproliferation and hyperkeratinization, antibiotics used mainly for their role against P. acnes and benzoyl peroxide products which are effective against P. acnes and lessen development of resistance to topical antibiotics. Systemic treatments include antibiotics agents which have anti-inflammatory properties and are effective against P. acnes, some hormonal therapies and isotretinoin, a systemic retinoid that is highly effective in the treatment of severe, recalcitrant acne but is associated with potentially dangerous adverse effects. 4)

During the past decade phototherapy using various light sources and lasers has become widely accepted as an alternative or additional treatment modality for acne, free of the side effects associated with drug therapies. 5) Light therapies are viable options for pregnant women, acne vulgaris that is refractory to previous therapies in patients who do not wish for long term treatment with oral antibiotics or other medication. Acne phototherapy is based primarily on photoexcitation of endogenous porphyrins produced by P. acnes bacteria resulting in the release of singlet oxygen, but may also involve photocogulation of blood

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vessels that surround the acne lesions. Studies using blue light devices or pulsed dye lasers have shown 60% reduction in inflamed lesion counts following eight treatment sessions spaced over a period of 4 weeks.\(^6\)

Light and Heat energy (LHE\(^{TM}\)) systems combine acne phototherapy with a pulse of heat which contributes to anti-inflammatory reactions and soothes the painful lesions associated with acne. This additional heat also speeds up the reaction time and intensifies the basic chemical process associated with the release of singlet oxygen from the photo-excited porphyrins. A multi-center, clinical study was conducted to evaluate LHE for the treatment of mild to severe inflammatory acne vulgaris.\(^7\) The study included three phases: control period, treatment period and follow-up period. The patients served as their own control by foregoing any method of treatment for a period of 4 weeks. After completion of the control period, the patients were treated twice a week for a period of 4 weeks. Follow-up for safety and effectiveness evaluations were performed following each one of the treatments and 4 weeks following the last treatment.

Patients with mild to severe acne were enrolled in the study but only pustules and papules (inflamed lesions) were assessed for efficacy evaluation. In total, in 75% of the treated areas 50% or greater reduction in inflamed lesions was recorded following the treatment regimen, while no such improvement was achieved following the control period. Following the follow-up phase, a mean reduction of 60.2% was achieved as compared to an increase of 32.4% measured after the control phase. Erythema was the only side effect reported and in all cases, it was minimal and transient. Based on this study Radiancy's LHE\(^{TM}\) technology has received CE and FDA clearance for the treatment of mild and moderate inflammatory acne.

Acne drug therapy as well as acne phototherapy often leaves vascular, pigmented and textural defects on the patients skin. We report on our experience using LHE\(^{TM}\) technology in a Double Phototherapy Protocol to treat both active inflammatory acne as well as its aesthetic manifestations.

**Treatment Technique**

The LHE system used in this study is the Radiancy Mistral equipped (Radiancy company LTD Hod asharon, Israel) with the Acne and Skin Rejuvenation and Skin tightening treatment heads. The system emits broad band light with wavelengths in the range of 400-1800 nm, adjustable pulse durations from 10 to 85 msec and an optical fluence of 4-25 J/cm\(^2\) per pulse. Pulses per face treatment was about 40. Two treatment regimes will be described here as part of our clinical experience and in order to comply with the different acne clinical aspects.

1. **Inflammatory acne -** Patients first underwent a series of 8-10 bi-weekly LHE treatments to reduce their dermal inflammatory process. These treatments were often combined with keratolytic agents. In cases of hormonal imbalance some hormonal systemic therapies such as spironolactone were also included.

2. **Inflammatory Pustular acne -** In cases of deep and widely spread pustular acne, systemic antibiotics such as minocycline 100mg/day for 1 month were administered in parallel to acne phototherapy. For patients with severe cystic acne where isotretinoin (Accutane) is indicated, several acne phototherapy treatment sessions were performed prior to Accutane administration in order to reduce the flare up often associated with this modality. This approach is an alternative to co administration with steroids at the onset of therapy to prevent initial worsening. For the scars, 6 weeks after the accutane treatment ending, skin rejuvenation and skin tightening treatments are administered once or twice a month to prevent additional scaring and over the scars to initiate reorganization and focal heating of the scar base to encourage the collagen renewal process.

Acne phototherapy is applicable to any anatomic area prone to acne including the face, upper chest, back and shoulders.

Following resolution of acne lesions with the combined LHE and drug protocol, patients may develop post acne symptoms which include localized erythema, post inflammatory hyperpigmentation and scars. To eliminate or reduce these symptoms, the combined LHE/drug treatment regimen is followed by a series of LHE skin rejuvenation treatments. Using the Mistral skin rejuvenation handpiece 4-5 treatment sessions are performed at monthly intervals to coagulate small, superficial blood vessels, to lighten skin pigmentation and to induce neocollagenesis to improve skin texture. Additional glycolic acid skin exfoliation may be advised for some patients.

Stringent sun protection must be practiced during and following this combined treatment. Finally, maintenance therapy with topical retinoids can be advised to
minimize potential for relapse as recommended by Gollnick. Single LHE skin rejuvenation treatments may also be offered once every 6-12 months to maintain the aesthetic results.

LHE double phototherapy combined with drug therapy is applied to male and female patients of all ages suffering from mild to moderate inflammatory acne. Pregnancy is not a contraindication for this therapy as long as legal consent is obtained.

**Typical Results**

A 24 years old female with Fitzpatrick skin type III was treated with the LHE Double Phototherapy technique for a total period of 5 months. Before and after photographic results are presented in Fig 1. The patient had been suffering from acne for a period of 6 years. She had been taking Diane-35 pills to control her acne, switched to Mercilon but presently wished to discontinue pills. LHE Double Phototherapy protocol resolved almost all of her active acne inflammations and significantly improved the appearance of her skin. The skin appears smoother, more homogeneous and fresher. The patient is extremely satisfied with the results.

**Conclusions**

LHE phototherapy has been separately documented in the past for the treatment of active inflammatory mild and moderate acne as well as for skin rejuvenation of sun damaged, aging skin. Our proposed Double Phototherapy protocol for acne patients utilizes LHE’s documented effects on sun damaged skin to treat similar post acne symptoms of localized erythema, post inflammatory hyperpigmentation and scars. Additionally this protocol combines drug therapies which have been the mainstay of acne treatment yet are not contraindicated with phototherapy. This protocol appears to offer excellent clinical and aesthetic results with no side effects or complications and may be repeated if relapse occurs.

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**References**