

# Treatment of Acne using the Beamax IPL System with a 415nm Handpiece

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## INTRODUCTION

Acne is a chronic disease of the pilosebaceous follicle and is the most common skin disease, affecting up to 80% of individuals at some time in their lives. Acne begins usually in adolescence, when hormonal changes cause the enlargement and then the obstruction of sebaceous glands in the skin. The obstruction of the gland opening causes the accumulation of sebum, which is followed by abnormal proliferation of the bacterial population, predominantly *Propionibacterium acnes* (*P. acnes*). These pathophysiologic events result in the clinical expression of the painful, inflammatory pustules of acne. Not only can they cause disfigurement and permanent scarring, they can also have an adverse effect on psychological development, resulting in profound emotional lack of confidence, which may lead to social phobias, withdrawal from society, clinical depression, and suicide. Topical acne medications are usually irritating to the skin and more than 40% of acne bacteria are insensitive to oral antibiotics. Therapy with Accutane is associated with possible severe side effects, is costly and involves long treatment. Treatment time for responsive patients is usually at least three to four months.

Sun exposure is known to have some beneficial effects in up to 70% of patients with acne. Although solar or artificial UV light has a mild camouflage effect on acne, its comedogenic and photo-aging effects diminish its use in acne therapy. It is known that *P. acnes* produce porphyrin during their normal life cycle, as part of their normal metabolic process. Visible light in the blue range, or to a lesser extent in the red range, induces a photo destructive effect on *P. acnes* that may take part in the decrease in acne

severity during the summer. A decrease in the number of acne lesions was achieved previously by exposure to light sources that produce blue light, red light, mixed violet and ultra-violet or low intensity fluorescent or LED light (blue and red).

A rapid growth in demand for aesthetic, light-based devices has led to substantial investment in the development of more effective and safer systems for the treatment of acne. SharpLight's new Beamax system is the result of such research and development efforts. This article summarizes SharpLight's experience with the Beamax system in acne phototherapy with the 415nm handpiece.

## MATERIALS AND METHODS

The system used for acne phototherapy was the Beamax intense pulsed light system with:

- Long pass filter of 415 nm (acne blue handpiece)
- Spot size of 6.4 cm<sup>2</sup>
- Fluence range of up to 8J/cm<sup>2</sup>
- Pulse durations of 30, 40, and 50 msec.

A series of 8 treatment sessions spaced over a period of 1 month is usually sufficient to reduce the number of papules and pustules by 60-65%. Patients undergoing the procedure enjoy shorter disease duration, reduced psychological stress and less likelihood for lesions to leave permanent scars.

Broad spectrum IPL phototherapy, available with the 415 nm treatment handpiece, is based on 3 clinical mechanisms:

1. Visible light absorption in *P. acnes* produced porphyrin resulting in the release of singlet oxygen that destroys the bacteria.

2. Green to yellow light produces coagulation of blood vessels that feed the acne lesions.

3. Infrared heat helps in drying up the lesion.

The large spot size of the Beamax typically enables full face treatment in a short 10-20 minute session.

This clinical study was conducted on 60 patients aged 16-24 with mild to moderate acne. Treatments were performed at the American Laser Clinics in Rishon Le Zion, Israel, and by several beauticians in Israel, between April and September 2006.

All subjects completed a medical history form and were screened for any contraindications. They were briefed on the procedure, potential complications, and realistic expectations, and then signed an informed consent form.

For subjects under 18 years of age, a parent was asked to provide consent and sign the consent form.

Areas designated for treatment were then photographed. Cold ultrasound gel was used for the treatments. No topical anesthesia was applied. A test was conducted to determine optimal treatment parameters for each patient. In most cases, the various skin types were treated as follows:

- **Skin type I-II:** Fluence range of 7-8 J/cm<sup>2</sup> and pulse durations of 30 or 40 msec.
- **Skin type III:** Fluence range of 6-7J/cm<sup>2</sup> and pulse durations of 40 or 50 msec.
- **Skin type IV-VI:** Fluence range of 5-6J/cm<sup>2</sup> and pulse duration of 50 msec.

Patients were treated 2 times a week for a total of 8 treatment sessions, and were followed up 1-3 months after the last procedure.

## RESULTS

Treatment results as assessed by the treating physician are summarized in

Table 1. Percentage values represent physician assessment of lesion reduction as evaluated from the photographs.

All patients could comfortably bear the treatment and were not significantly affected by a feeling of pain. No adverse effects were recorded in this series of treatments apart from slight sensation of heat. Of the sixty (60) patients treated, thirty-seven (62%) were very satisfied with the results, eleven (18%) were satisfied with the results and the remaining twelve (20%) did not notice any significant improvement. No significant difference was noted between male and female patients.

Typical satisfactory photographic results are shown in Figs 1-2.

**Table1. Physician assessment**

Body Part Treated	First Treatment Clearance	Final Result in %	1 month after last Procedure	3 months after last procedure
Face	15%	62%	Same	Same
Upper Back	12%	55%	Same	Same
Shoulder	15%	50%	Same	Same

**Figure 1. Result of acne clearance (at 3 months follow-up)**



Courtesy of Rima Aboui P.M.E.C Private Clinic, Nazareth, Israel

**Figure 2. Result of acne clearance (at 3 months follow-up)**



acne in 80% of the treated patients. 62% of the patients reported high satisfaction with the results.

Physician assessment of lesion reduction was 62% for the face, 55% for the upper back and 50% for the shoulders.

These results are in line with those previously reported for blue light acne phototherapy systems as well as for intense pulsed light systems similar to the Beamax.

## CONCLUSIONS

Our initial experience with the Beamax 415nm acne phototherapy system demonstrates improvement in mild to moderate inflammatory

## REFERENCES

1. Jowett S, Ryan T: Skin disease and handicap: an analysis of the impact of skin conditions. Soc Sci Med 1985; 20 (4): 425-9
2. Gupta MA, Gupta AK: Depression and suicidal ideation in dermatology patients with acne, alopecia areata, atopic dermatitis and psoriasis. Br J Dermatol 1998; 139 (5): 846-50
3. Cotterill JA, Cunliffe WJ: Suicide in dermatological patients. Br J Dermatol 1997; 137 (2): 246-50
4. Norris JF, Cunliffe WJ: A histological and immunocytochemical study of early acne lesions. Br J Dermatol 1988; 118 (5): 651-9
5. Mouser PE, Baker BS, Seaton ED, et al. Propionibacterium acnes reactive T-cell lines established from early inflamed acne lesions [abstract]. J Invest Dermatol 2001; 117: 803
6. Leyden JJ, McGinley KJ, Mills OH, et al. Propionibacterium levels in patients with and without acne vulgaris. J Invest Dermatol 1975; 65 (4): 382-4
7. Melo TB. Uptake of protoporphyrin and violet light photodestruction of Propionibacterium acnes. Z Naturforsch [C] 1987; 42 (1-2): 123-8
8. Lee WL, Shalita AR, Poh-Fitzpatrick MB. Comparative studies of porphyrin production in Propionibacterium acnes and Propionibacterium granulosum. Bacteriol 1978; 133 (2): 811-5
9. Konig K, Ruck A, Schneckenburger H. Fluorescence detection and photodynamic activity of endogenous protoporphyrin in human skin. Optical Engineering 1992; 31(7):1470-1474.
10. Kjeldstad B, Johnsson A. An action spectrum for blue and near UV inactivation Propionibacterium acnes; with emphasis on a possible porphyrin photosensitization. Photochem Photobiol 1986; 43 (1): 67-70
11. Byrne PA, Williams BD, Pritchard MH. Minocycline-related lupus. Br J Rheumatol 1994; 33 (7): 674-6

12. Goldberg, David; Russell, Bruce. Combination blue (415 nm) and red (633 nm) LED phototherapy in the treatment of mild to severe acne vulgaris. J of Cosmetic and Laser Therapy - Volume 8, Number 2, June 2006, pp. 71-75(5)

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