

# Clinical Study on the Treatment of Acne Using the DiamondSkin Microdermabrasion System

Michael Ullfelder, MD - Montreal Institute of Dermatological Studies, Canada

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## Background

*Acne vulgaris* is a disorder of sebaceous follicles that has multiple factors contributing to its onset. It is associated with an increase in sebaceous gland activity, insufficient shedding of cellular debris plugging the gland's duct and follicle, and proliferation in this oil-rich medium of the bacterium *Propionibacterium acnes* (*P. Acnes*). The excessive accumulation of sebum and bacteria in the pilosebaceous unit leads to formation of pustules, inflammatory papules and cysts. Severe acne may leave permanent scarring.

A variety of drugs are used in the treatment of acne and they target the various factors involved in its pathogenesis. Retinoids effectively increase the shedding of debris from the pilosebaceous ducts by decreasing the proliferation and differentiation of epidermal cells and they also inhibit sebaceous gland activity. They are the most effective drugs to treat acne (i.e., Accutane) but their use is associated with severe side effects (night vision impairment, cracked lips, bone aches, reversible hair loss and, most dangerously, severe teratogenic effects on the fetus if pregnancy occurs while taking this drug). Antibiotics inhibit *P. acnes* bacteria, and are the mainstay of therapy in combination with topical retinoids and peroxide compounds. The majority of teenagers, and about 30% of adult women suffer from acne. In women, the problem is particularly frustrating because Accutane cannot be used during childbearing years, and antibiotics have frequent side effects.

Sun exposure is known to have a beneficial effect on patients with acne. Visible light in blue range, and to a lesser extent in the red range, is effective in treating *acne vulgaris* through a mechanism similar to that of photodynamic therapy. *P. acnes* produces a large amount of endogenous porphyrins, and when exposed to light these porphyrins release singlet oxygen that is effective in killing bacteria and reducing the severity of acne.

## Treatment Objectives

A practical and effective microdermabrasion treatment for acne in the presence of pharmaceutical and device-based treatments must meet the following criteria: it must be comfortable and tolerable without use of topical anesthetics, it must be quick (15-20 minutes per session is ideal), and the number of sessions should not exceed three treatments. The treatment is considered successful when the patient exhibits at least 20% improvement in the number of lesions three weeks after treatment, and at least one grade improvement on the severity grading scale.

## Treatment Protocol and Preliminary Results

Seventeen patients (males and females, 15-46 years old) with Fitzpatrick skin type I-IV were enrolled in the clinical study. All of them suffered from facial refractory acne for a number of years and had used conventional topical and/or oral medication with unsatisfactory or mixed results. Even those who responded to the medication developed acne again when taken off the medication. It appears that a longer individual microdermabrasion treatment with the DiamondSkin creates a gradual reduction in the comedones count without Retin-A-like flare.

## Conclusions

Treatment of acne with the DiamondSkin crystal-free system is a promising alternative to current topical and oral anti-acne remedies. There is very strong indication that patients should be treated at two week intervals for 4-6 sessions. Most patients have ended up needing a few treatments during the three-month period, and it appears that it is better to "stay ahead" of the acne, and gently push therapy to clearing rather than waiting for increased acne activity as measured by increased comedone count. This protocol will lead to fewer Retin-A-like flare-ups, happier patients and fewer withdrawals from the study.