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## Efficacy of Lasers and PDT for the Treatment of Acne Vulgaris\*

M. H. Gold, MD

Gold Skin Care Center, Tennessee Clinical Research Center, Nashville, TN, USA

Clinical Assistant Professor, Department of Dermatology,  
Vanderbilt University School of Medicine, School of Nursing

Huashan Hospital, Fudan University, Shanghai, China

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### ABSTRACT

*Acne vulgaris can represent a therapeutic challenge in terms of managing ongoing symptoms and preventing scar formation. While the copious variations of available treatments address milder forms of the disease, until recently, therapies for resistant or moderate-to-severe forms were limited to systemic agents that were accompanied by potentially severe side-effects. With the addition of lasers, light sources, and aminolevulinic acid-photodynamic therapy (ALA-PDT) therapies, dermatologists may now have viable new alternatives for treating all grades of acne severity that circumvent the negative side-effects associated with many conventional options.*

**Key Words:** Acne vulgaris, aminolevulinic acid, ALA, photodynamic therapy, PDT, lasers, light sources

Acne vulgaris is one of the most common dermatologic disorders seen in dermatology. Reports have noted that upwards of 30% of all dermatologic appointments are for this inflammatory condition, which involves the sebaceous glands. Its prevalence is supported by reports, which estimate that 70%–96% of the general population will suffer from acne vulgaris at some point in their lifetime.<sup>1</sup>

### New Therapies for Acne Vulgaris

Medical therapy remains the gold standard for the treatment of acne vulgaris. As clinicians, we are fortunate to have at our disposal, a substantial range of therapeutic agents (both topical and systemic) to offer our patients. Because of the complexities involved in successfully managing acne, therapeutic advances that offer shortened response times, and simplified treatment regimens are constantly being explored. Lasers and other light sources, as well as photodynamic therapy (PDT), are newer therapies that are gaining a great deal of support.

The PDT mechanism of action seen in acne vulgaris lesions involves the production of porphyrins by *Propionibacterium acnes* (*P. acnes*) bacteria during their growth and proliferation in the follicular units, transforming them from noninflammatory to inflammatory lesions. The porphyrins produced during this proliferative phase are known as protoporphyrin IX (PpIX) and coproporphyrin III. These porphyrins have an absorption spectrum that is in the near ultraviolet (UV) and visible spectrum of light; the absorption spectrum for coproporphyrin III is similar. The major absorption peak for these porphyrins is at 415nm, known commonly as the Soret band. This

absorption peak is in the blue range of the visible light spectrum. A second major peak, seen at 630nm, is also visible in the absorption spectrum, which corresponds to red light. Therefore, phototherapy devices have been developed that utilize either blue light or red light PDT for the treatment of inflammatory acne vulgaris lesions. The PDT process seen in this reaction involves the photoexcitation of the *P. acnes* porphyrins after exposure to the appropriate light source. This will then form singlet oxygen within the microorganism itself, resulting in the selective destruction of the bacteria. The reaction occurs rapidly and has been observed *in vivo*. In addition, by utilizing a topical photosensitizer to the reaction, a synergistic effect has been demonstrated, making PDT a viable option for many suffering from inflammatory acne vulgaris.<sup>2-4</sup>

Lasers and light sources that have been developed to treat acne vulgaris fall into two classes: those that destroy the sebaceous glands themselves and the entire pilosebaceous unit, and those that destroy *P. acnes* through a PDT reaction. Medical devices that kill these bacteria include blue and red light sources, green light lasers, yellow light lasers, intense pulsed light (IPL) sources, and radiofrequency (RF) devices. Furthermore, recent interest has emerged in exploring the destruction of *P. acnes* and the partial destruction of the sebaceous glands, as well as the proposed mechanism of action for PDT in the treatment of inflammatory acne vulgaris lesions.<sup>5</sup>

### Blue Light Systems

The first blue light device approved by the US FDA for the treatment of inflammatory acne vulgaris was a high-intensity, narrow-band blue light source (405nm–420nm), known as the ClearLight Acne Photoclearing™ System (Lumenis/ CureLight). It has US FDA approval for the treatment of mild-to-moderate inflammatory acne vulgaris. Kawada, et al.<sup>6</sup> reported a 64% reduction in mild-to-moderate inflammatory acne vulgaris in 30 patients who received twice weekly therapy for 5 weeks. In a multicenter study by Shalita,<sup>7</sup> the ClearLight™ system was administered to 35 patients twice weekly for 4 weeks. At the end of the clinical trial, 80% of the participants noted significant improvement in their acne vulgaris lesions. Adverse events were not reported and all skin types were able to be treated with this high-intensity blue light source. Gold<sup>8</sup> also reported his experience with the ClearLight™ system. Forty patients received blue light therapy twice weekly (15 minutes per session) and were evaluated at 1 and 3 months following their last blue light treatment. There was an average reduction of 43% of inflammatory acne vulgaris lesion counts. The study population included both responders and nonresponders to other antiacne therapies.

Several other trials involving blue light have also been

reported in the literature. Papageorgiou, et al.<sup>9</sup> compared a daily mixed blue and red light phototherapy system (415nm and 660nm) with either blue light or white light applied 15 minutes daily for 12 weeks. The combination of blue and red light reduced inflammatory acne vulgaris lesions by 76% vs. 58% in the blue light only group. Both were superior to white light (25%). When Meffert, et al.<sup>10</sup> used a high-energy broad spectrum blue light source that combined blue light and UVA at a wavelength of 410nm–420nm, they reported marked improvement in patients with pustular acne vulgaris after 10 treatments.

A second blue light source, known as the Blu-U® (DUSA Pharmaceuticals) is available in the US. Goldman, et al.<sup>11</sup> reported on its effectiveness in treating 12 inflammatory acne vulgaris lesions; treatments were administered twice weekly for 6 minutes per session. Acne lesion counts, which were performed 2 weeks after the final treatment, showed a 40% reduction in papular lesions, a 65% reduction in pustular lesions, and a 62% reduction in comedonal lesions. A second study compared this blue light system with topical 1% clindamycin. This multicenter analysis showed that the blue light therapy was more effective than the topical clindamycin in reducing inflammatory acne vulgaris lesions.<sup>12</sup>

A third blue light system, the OmniLux™ Blue (Photo Therapeutics Ltd.), has also shown effectiveness in the treatment of inflammatory acne vulgaris lesions. This LED blue light system has demonstrated an average reduction of 74% in inflammatory acne vulgaris lesions.<sup>13</sup>

### Green Light Systems

Green light lasers with a wavelength of 532nm have been reported to be effective in treating inflammatory acne vulgaris lesions. Clinical studies on inflammatory acne vulgaris are available for the 532nm Aura-i™ Laser System and 532/1064nm Gemini™ Laser System (Laserscope). Bowes, et al.<sup>14</sup> evaluated 11 patients with mild-to-moderate inflammatory acne vulgaris lesions in a split-face prospective, randomized clinical trial. Four total treatments were given at fluences of 7–9J/cm<sup>2</sup> utilizing a 4mm spot size and pulse duration of 20msec with parallel contact cooling. Patients received 6–10 passes over the half-treated face. At the 1 month follow up evaluation, acne lesion counts decreased by 35.9% vs. 11.8% on the contact cooling side. Sebum measurements were reduced by 28.1% on the laser treated side vs. 6.4% on the contact cooled side.

### Yellow Light Systems

Yellow light pulsed dye lasers (585nm–595nm) are regularly used by clinicians to treat inflammatory acne vulgaris. Seaton, et al.<sup>15</sup> evaluated the efficacy of a low-fluence pulsed dye laser (PDL) in the treatment of inflammatory acne vulgaris lesions in 41 patients. This

was a double-blind, randomized clinical trial where 31 individuals received PDL and 10 patients received a placebo treatment. All of the patients in this trial received one treatment with the PDL or the placebo device, and were then followed for 3 months. Acne severity decreased from 3.8 to 1.9 in the PDL group vs. 3.6 to 3.5 in the placebo group (using a modified Leeds grading system). Total lesion counts were 53% (49% inflammatory reduction) vs. 9% in the placebo group. However, a second clinical trial did not confirm these results.<sup>16</sup> This subsequent study was a randomized, single-blind, controlled, split-face analysis of 40 individuals receiving 1–2 treatments with the PDL. No significant differences were achieved using the Leeds grading scores or in lesional counts between the laser treatment group and the control group. It is evident from these trials that much work remains to be done to determine the total effectiveness of the PDL for the treatment of inflammatory acne vulgaris. Nonetheless, most clinicians who utilize PDLs in their everyday practice are confident of their efficacy and safety profile.

### Intense Pulsed Light Sources

A variety of intense pulsed light (IPL) sources have been used to treat inflammatory acne vulgaris. The first IPL system to report benefits was initially known as the ClearTouch™ (Radiancy Inc.), but is now known as the SkinStation®. The device uses light and heat, known as LHE technology, to trigger the destruction of the *P. acnes* bacteria. Elman, et al.<sup>17</sup> treated 19 patients and showed that 85% of the individuals had a >50% improvement in their acne vulgaris lesions following twice weekly therapy for 4 weeks.

Dierickx<sup>18</sup> reported on the Lux V™ handpiece from the Palomar Medical Technologies IPL systems (EsteLux®, MediLux™, and StarLux™ Systems). Fourteen patients with mild-to-moderate inflammatory acne vulgaris lesions received 5 treatments that were administered every 2–4 weeks. Two to three passes were made at an average fluence of 10J/cm<sup>2</sup>. At 6 months post-therapy, clearance rates of 72% for noninflammatory acne vulgaris lesions and 73% for inflammatory acne vulgaris lesions were observed.

### Lasers That Destroy Sebaceous Glands

Several laser systems have been used to treat inflammatory acne vulgaris by destroying the sebaceous glands. These include the near-infrared lasers and radiofrequency devices that are used as monotherapy. The three near-infrared lasers being studied for acne vulgaris are the 1320nm CoolTouch CT3™ (CoolTouch Inc.), the 1450nm SmoothBeam® (Candela Corporation), and the 1540nm erbium glass Aramis® (Quantel Medical). Paithankar, et al.<sup>19</sup> used the 1450nm SmoothBeam® laser

with a cryogen spray in 27 patients. Bilateral areas on the back were evaluated: one side received the treatment and the other served as the control. Four treatments were given at 3 week intervals. The average fluence used was 18J/cm<sup>2</sup> and patients were tracked for 6 months following their last laser therapy session. Results showed a 98% reduction in inflammatory acne vulgaris lesions after four treatments. At follow-up, 100% lesion clearance was seen in all but one of the study participants. A second trial by Friedman, et al.<sup>20</sup> studied facial acne vulgaris in 19 patients. Subject evaluations showed that lesion counts decreased by 37% after one treatment, 58% after two treatments and 83% after three treatments. Treatment related side-effects included transient erythema and edema. Topical anesthetics were utilized to minimize the discomfort routinely associated with these laser procedures.

Tuchin, et al.<sup>21</sup> and Lloyd, et al.<sup>22</sup> reported their experiences with indocyanine green (ICG) and the use of a diode laser in the destruction of the sebaceous glands and the reduction of inflammatory acne vulgaris. ICG, a fluorescent dye used for imaging purposes, acts as a sensitizing agent to help target the sebaceous glands. The combined use of ICG with diode lasers (810nm–900nm) showed a reduction in inflammatory acne vulgaris lesions. Lloyd, et al.<sup>22</sup> studied 22 patients with acne of the face or back. The targeted areas were stained with the ICG for 5–15 minutes and then irradiated with a diode laser. Multiple treatments were required in order to decrease the acne vulgaris activity. The 1540nm laser has also been reported to be effective in the treatment of inflammatory acne vulgaris.<sup>23</sup>

Ruiz-Esparza, et al.<sup>24</sup> reported a preliminary observation with the use of monopolar radiofrequency (RF) in the treatment of inflammatory acne vulgaris. Twenty-two patients were treated twice with the ThermoCool® device (Thermage, Inc.); the average fluence was 72J/cm<sup>2</sup>. Follow-up visits ranged from 1–8 months and excellent responses were seen in 82%, modest responses in 9%, and no response in 9% of the patients. Patients were administered topical anesthesia because treatment with this device can cause a great deal of discomfort. Additional clinical trials are needed to further evaluate the effectiveness of RF in the treatment of moderate-to-severe inflammatory acne vulgaris.

### ALA-PDT in the Treatment of Inflammatory Acne Vulgaris

Topical 5-aminolevulinic acid with photodynamic therapy (ALA-PDT) has a US FDA approved indication for the treatment of nonhyperkeratotic actinic keratoses (AKs) of the face and scalp with a blue light source for 16 minutes and 40 seconds. ALA is known to accumulate in actinically damaged skin cells, nonmelanoma skin cancer cells, and in the pilosebaceous unit. In the US, the only

ALA currently available is Levulan® Kerastick™ (DUSA Pharmaceuticals). The European equivalent, which is the methyl ester of ALA, is marketed as Metvix® (PhotoCure ASA/ Galderma). ALA has US FDA clearance for the treatment of nonhyperkeratotic AKs of the face and scalp. In the US, this drug will be known as Metvixia® and will be available for the treatment of nonhyperkeratotic AKs. PhotoCure ASA will be distributing the methyl ester ALA for the treatment of acne vulgaris.

The first reported clinical trial using ALA in the treatment of acne vulgaris was reported by Hongcharu, et al.<sup>5</sup> The investigators studied 22 individuals treated with ALA, which was incubated for 3 hours, in combination with a 550nm–700nm broad band light source. Significant clinical clearance was evident after 4 weekly ALA-light treatments. The PDT effect (downtime experienced during the healing process) consisted of acneiform folliculitis, post-inflammatory hyperpigmentation, superficial peeling, and crusting. Partial destruction of the sebaceous glands was implicated as the major contributing factor in explaining the mechanism of action. In a case study, Itoh, et al.<sup>25</sup> reported using a 635nm pulsed excimer dye laser and a 4-hour ALA drug incubation in a single patient with intractable acne vulgaris on the face. The treated area remained disease free over the 8-month follow-up period. The patient did experience a PDT effect and exhibited erythema, edema, and crusting immediately after the therapy. In a subsequent study, Itoh, et al.<sup>26</sup> treated 13 acne vulgaris patients with ALA-PDT and a 600nm–700nm light from a halogen light source. All patients showed improvement in their inflammatory lesions, with new lesions reduced at 1, 3, and 7 months post-therapy. Once again, a PDT effect was seen and some recurrence was noted 6 months following therapy.

Goldman used short-contact, full-face ALA-PDT to treat acne vulgaris and sebaceous gland hyperplasia utilizing a 1-hour ALA incubation and therapy with either an IPL or blue light activation. Relative clearing of the inflammatory acne vulgaris lesions was seen after 2–4 once-weekly ALA-PDT treatments. Treatments were noted to be pain free and no PDT effect was observed.

Gold<sup>28</sup> used 30–60 minute ALA drug incubation times and a high-intensity blue light source to evaluate the effects on moderate-to-severe inflammatory acne vulgaris lesions. ALA-blue light treatments were administered once-weekly and patients were evaluated at 1 and 3 months following their final therapy session. Study findings included a response rate of 60%, treatments were well tolerated, and no PDT effects were observed in any of the patients.

Goldman, et al.<sup>29</sup> treated 22 patients with moderate-to-severe inflammatory acne vulgaris using blue light, with

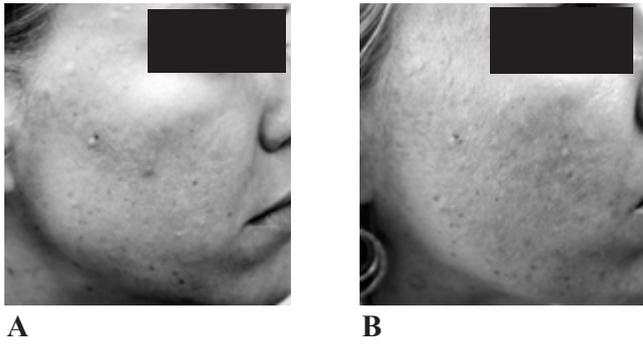
and without the ALA. There was a greater response in the ALA-PDT blue light group than in the blue light group alone, and no adverse events were seen. Taub<sup>30</sup> treated 18 patients with short-contact, full-face therapy utilizing blue light sources (ClearLight™ or Blu-U®) or an IPL with radiofrequency (Aurora®, Syneron). The patients received 2–4 treatments over a 4–8 week time period. Improvement was noted at 4 months following the last treatment: 11 out of 18 patients showed 50% improvement, and 5 exhibited >75% improvement.

Gold, et al.<sup>31</sup> reported their experience with short-contact, full face therapy utilizing ALA and an IPL, the Harmony® device (Alma Lasers). Patients received once weekly ALA-IPL treatments and were tracked for up to 3 months following their final treatment. A 72% reduction in acne lesions was seen and no PDT effects were observed.

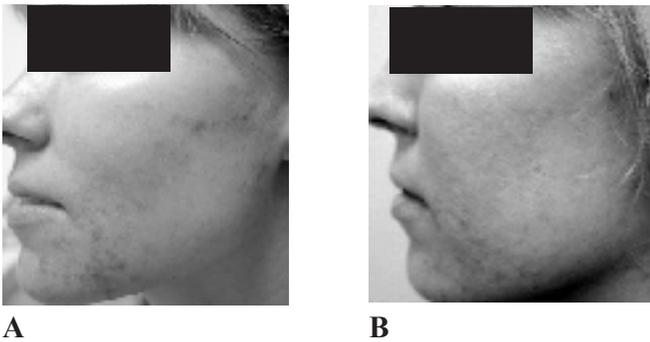
Two split-face IPL treatments with ALA-PDT were recently reported in the literature. Santos, et al.<sup>32</sup> explored the effectiveness of ALA-PDT in moderate-to-severe inflammatory acne vulgaris lesions utilizing ALA-PDT and the Quantum™ IPL device (Lumenis Ltd.). Thirteen patients were treated with short-contact, full face therapy. The IPL was used with a 560nm filter, double pulsed with 2.4/6.0msec, a 25msec pulse delay, and fluences of 26–34J/cm<sup>2</sup>. In this split-face analysis, 10 out of 13 patients showed a marked response in the ALA-IPL treated side vs. the IPL side alone after a single treatment. A second split-face clinical trial, performed by Rojanamatin, et al.,<sup>33</sup> confirmed the results described by Santos, et al. They evaluated 14 patients in a split-face fashion with an IPL and found that the ALA-IPL combination was superior to treatment with the IPL alone.

A study by Alexiades-Armenakas<sup>34</sup> reported that an average drug incubation time of 45 minutes, and an average of three PDL treatment sessions produced clearance in all 14 patients. Miller and Van Camp<sup>35</sup> also reported on the successful use of ALA and the potassium titanyl phosphate (KTP) laser in patients with inflammatory acne vulgaris. Clinical examples of acne vulgaris treated with ALA-PDT are shown in Figures 1–3.

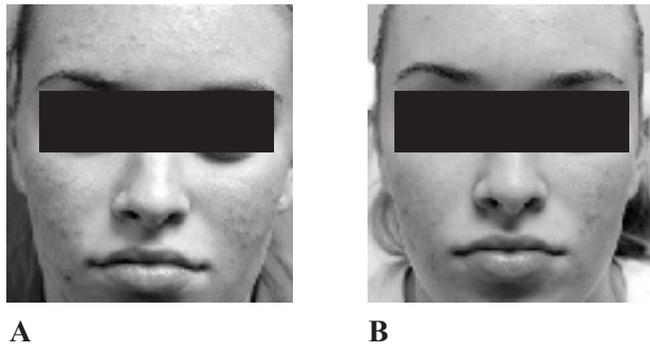
At the time of this writing, a large multicenter controlled clinical trial is underway in the US, which is further evaluating the use of ALA in the treatment of moderate-to-severe inflammatory acne vulgaris. The study is investigating the effectiveness of the blue light source in an FDA phase II trial to determine what future role ALA might have in the US.



**Figure 1:** Clinical example of ALA-PDT for the treatment of acne vulgaris. Before treatment (A) and after 2 treatments (B).



**Figure 2:** Clinical example of ALA-PDT for the treatment of acne vulgaris. Before treatment (A) and after 3 treatments (B).



**Figure 3:** Clinical example of ALA-PDT for the treatment of acne vulgaris. Before treatment (A) and after 3 treatments (B).

In Europe, the methyl ester form of ALA has been evaluated in several small clinical trials for the treatment of inflammatory acne vulgaris. In the first report, Wiegell and Wulf<sup>36</sup> studied 21 patients with moderate-to-severe inflammatory acne vulgaris. Two treatments were given to these individuals 2 weeks apart. The areas treated were prepared, as is standard practice, for the use of the methyl ester of ALA, by being gently curetted prior to the application of the medication, which was occluded

for 3 hours before exposure to a red light source. Twelve weeks after the treatments, there was a 68% reduction in inflammatory acne lesion counts, whereas a control group showed no change in their lesions. All patients in the study experienced a PDT effect consisting of severe erythema, pustular eruptions and exfoliation of the skin. Moderate-to-severe pain during the treatments was also noted. A second European clinical trial, by Horfelt, et al.,<sup>37</sup> looked at 30 individuals with moderate-to-severe inflammatory acne vulgaris lesions. This was a split-face analysis, with a 3-hour under-occlusion drug incubation and exposure to red light; two more treatments were given at 2 week intervals. At the end of the clinical trial, 12 weeks after the last treatment, there was a statistical reduction in acne lesions of 54% vs. 20% in the control group. Pain and a PDT effect were once again seen in the patients treated. Additional clinical trials are underway in Europe to further evaluate what role the methyl ester of ALA will have in the treatment of moderate-to-severe inflammatory acne vulgaris.

### Conclusions

We are at an exciting time in the evolution of acne therapy, as many new advances are providing positive results for our patients. Lasers and light sources have become a useful addition to our therapeutic armamentarium for acne vulgaris. The use of PDT may further enhance the benefits of these devices.

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# The Impact of Acne on Quality of Life

C. Zip, MD, FRCPC

Department of Medicine, University of Calgary, Calgary, AB, Canada

## ABSTRACT

*Optimal acne therapy must take into account not only acne type and severity, but also the impact of this skin disorder on the patient's quality of life. Several validated instruments have been used to measure quality of life in acne patients. By using these instruments, acne patients have been shown to experience levels of social, psychological and emotional distress similar to those reported in patients with asthma, epilepsy and diabetes. Several studies have demonstrated that the disability caused by acne can be mitigated by effective therapy.*

**Key Words:** acne vulgaris, quality of life

The psychological burden associated with acne was described years ago by Sulzberger and Zaidens<sup>1</sup>: "There is probably no single disease which causes more psychic trauma, more maladjustment between parents and children, more general insecurity and feeling of inferiority and greater sums of psychic suffering than does acne vulgaris." Despite general acceptance of the psychosocial impact of acne, measurement of its effect on quality of life (QOL) has only begun in recent years. This article will review the methods used to measure QOL in acne patients and what we have learned from this research.

## Measurement of QOL

QOL is generally measured using validated questionnaires. Several instruments have been designed: for use in many different diseases, for skin disorders only, or for one particular disease such as acne. General health measures, which can be used to assess many diseases, include the Short-Form 36 (SF-36) and the General Health Questionnaire. These can be used to compare the impact of skin disease with that of diseases affecting other systems. Dermatology-specific measures include the Dermatology Life Quality Index (DLQI)<sup>2</sup> and Skindex.<sup>3</sup> These are more sensitive indicators of the impact of skin disease on QOL and they can be used to compare one skin disease with another. Acne-specific QOL instruments include the Acne Disability Index (ADI)<sup>4</sup> and the Cardiff Acne Disability Index (CADI).<sup>5</sup> The CADI was derived from the ADI as a short, five-item questionnaire that could be used in clinical practice. Other acne-specific measures include the Acne-Specific Quality of Life (Acne-QOL) questionnaire,<sup>6</sup> which is designed for assessment of facial acne. A recently described four-item condensed version of the Acne-QOL<sup>7</sup> was developed for use in routine clinical practice. The Acne Quality of Life (AQOL) scale<sup>8</sup> focuses on the social and vocational aspects of acne. Greater impairment of QOL, as measured by the AQOL, was associated with greater

levels of anxiety and depression in one study.<sup>9</sup>

## Why Measure QOL?

Measuring the impact of acne on quality of life allows us to understand the disease from the patient's point of view. In clinical research, new medications are increasingly being evaluated according to their impact on QOL, which is in addition to the traditional approach of assessing only treatment safety and efficacy. In clinical practice, understanding how a patient's life is impacted by acne can help in selecting the most appropriate treatment for that patient and may enhance compliance.<sup>10</sup>

## How Acne Impacts QOL Compared with Other Diseases

Although acne is sometimes considered to be unimportant in comparison with other medical conditions, the associated morbidity is significant. Mallon, et al.<sup>11</sup> measured QOL in 111 acne patients using the DLQI, Rosenberg's measure of self-esteem, a version of the General Health Questionnaire, and the SF-36. The acne patients described levels of social, psychological and emotional problems that were as great as those reported by patients with asthma, epilepsy, diabetes, back pain or arthritis. Lasek, et al.<sup>12</sup> reported that adults with acne experienced functional and emotional effects comparable with those of patients who have psoriasis. Beattie, et al.<sup>13</sup> used the Children's Life Quality Index and the Children's Dermatology Life Quality Index to evaluate patients aged 5–16 years with various skin diseases and compared them with children suffering from other chronic medical conditions. Health-related QOL impairment in children with skin disease was at least equal to that experienced by children with other chronic illnesses, but atopic dermatitis and psoriasis caused greater disability than did acne.

## Acne Severity and QOL

Studies have failed to show a strong association

between acne severity and QOL.<sup>9,11,14</sup> Hence, it is difficult to ascertain the extent of disability caused by a given severity of acne, as QOL is dependent on a host of correlating factors that are as yet poorly understood. Rapp, et al.<sup>15</sup> reported that trait anger, the tendency to experience an angry mood easily, was significantly related to global and skin-related QOL, as well as to satisfaction with treatment. Furthermore, Krehci-Manwaring, et al.<sup>16</sup> proposed that dispositional social sensitivity in acne patients was independently associated with poorer social functioning and QOL.

### Age, Gender and QOL

Lasek, et al.<sup>12</sup> reported greater overall effects on QOL in older adult acne patients regardless of disease severity, with similar effects on both sexes. Jones-Caballero, et al.<sup>17</sup> also found that older patients had a worse acne-related QOL, although its influence was small. In this study, women experienced greater QOL impairment, although acne was significantly more severe in men. In a recent study<sup>18</sup> of Scottish teenagers aged 15–18 years, 11% of those with self-reported acne perceived their lives to be significantly affected by their acne. The rate of variance in this perception was negligible between the sexes.

### Impact of Acne Treatment on QOL

Several studies have shown improvement in QOL with effective acne treatment.<sup>17,19,20</sup> Using the SF-36, the DLQI, Rosenberg's measure of self-esteem, and a version of the General Health Questionnaire, Newton, et al.<sup>20</sup> monitored the QOL of patients who were referred to a dermatology clinic for acne treatment. As the clinical acne grade significantly improved with treatment, so did QOL, as measured by the four instruments used. Clinical and patient-assessed outcomes were most improved in isotretinoin treated patients. Two recent studies<sup>21,22</sup> have shown that instruction in appropriate cosmetic use enhances QOL in female acne patients.

### Conclusion

Acne can profoundly impact quality of life. As its effect on QOL does not always correlate with acne severity, the disability caused by acne must be taken into account when individualizing treatment. Effective acne therapy is associated with significant improvement in the quality of life of acne patients.

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Class	Name/Company	Approval Dates and Comments
<i>Antihistamine</i>	<b>Loratadine Dry Syrup 1%</b> <i>Claritin</i> <sup>®</sup> Schering-Plough	Japan's regulatory authority, the MHLW/KIKO, approved this once-a-day nonsedating antihistamine in October 2007 for the treatment of allergic rhinitis, urticaria and pruritus associated with skin diseases in children $\geq 3$ years of age. The dry syrup granule formulation is presently only available in Japan.
<i>Antiviral Agent</i>	<b>Valacyclovir Hydrochloride</b>  TEVA Pharmaceutical Industries	The US FDA has granted tentative approval for an Abbreviated New Drug Application in October 2007 for TEVA Pharmaceutical Industries to market its generic version of GlaxoSmithKline's antiviral product valacyclovir hydrochloride (Valtrex <sup>®</sup> ) tablets for the treatment of herpes zoster and genital herpes.

## Drug News

<i>Anti-dandruff Agent</i>	In January 2008, Head & Shoulders <sup>®</sup> Conditioner (Procter & Gamble), the first OTC anti-dandruff conditioner containing the active ingredient pyrithione zinc, will be available.
<i>Anti-acne Agent</i>	In October 2007, JSJ Pharmaceuticals launched two additional formulations of its anti-acne product line, Inova 8 <sup>™</sup> and Inova 8/2 ACT <sup>™</sup> , which incorporate benzoyl peroxide 8% alone or in combination with salicylic acid 2%. Both preparations use the EasyPad <sup>™</sup> technology that allows for leave-on single unit dosing.
<i>Anti-acne Agent</i>	Study results recently published in <i>Experimental Biology and Medicine</i> * provide a possible explanation for the controversial link between isotretinoin (Accutane <sup>®</sup> / Roaccutane <sup>®</sup> , Hoffmann La-Roche/ Roche) and depression. Isotretinoin is indicated for the treatment of severe recalcitrant nodular acne. Researchers have unveiled the potential for isotretinoin to reduce the availability of serotonin (5-HT), a neurotransmitter implicated in the regulation of emotional responses, moods, sleep, and other physiologic and neurologic functions. Reduced levels of 5-HT are believed to trigger aggressive behavior and the onset of clinical depression. Prior to the release of these study findings, the association between isotretinoin and depression was suspected, however, until now, the precise relationship could not be established. The research found that the drug altered the chemistry of the cells that manufactured serotonin and interfered with the process by which the neurotransmitter directs signals between neurons in the central nervous system. Additional research is required to further explore the link and understand the precise mechanism of action. *O'Reilly KC, et al. <i>Exp Biol Med</i> 232(9):1195-203 (2007 Oct).
<i>Melanoma</i>	A large prospective French study uncovered a potential link between an elevated risk of melanoma and a history of endometriosis. The study, recently published in the <i>Archives of Internal Medicine</i> *, examined 91,965 women between the ages of 40-65, who were tracked for 12 years via completion of questionnaires every 2 years. Study findings included the identification of 363 cases of melanoma, along with evidence suggesting that a history of ovarian cysts, uterine polyps, breast adenoma, breast fibroadenoma, or breast fibrocystic disease did not pose an increased risk of developing melanoma. However, a history of endometriosis (n=5,949) indicated a considerably higher risk of melanoma (relative risk: 1.62; 95% confidence interval (CI): 1.15-2.29). An increased risk also appears to exist among women with a history of fibroma (n=24,375), as compared with those without such a history (relative risk: 1.33; 95% CI: 1.06-1.67). These results may warrant heightened attention by physicians toward patients fitting the profile described in an effort to improve the early detection and management of melanoma.*Kvaskoff M, et al. <i>Arch Intern Med</i> 167(19):2061-5 (2007 Oct 22).

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