Complementary, Holistic, and Integrative Medicine: Acne

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Author Disclosure
Drs Sawni and Singh have disclosed no financial relationships relevant to this article. This commentary does contain a discussion of an unapproved/investigative use of a commercial product/device.

Introduction
Acne vulgaris is a common skin disorder that affects ~70% to 87% of adolescents and young adults. (1) The pathogenesis of acne is multifactorial and complex, and is thought to be due to androgen-stimulated sebum production. This production leads to follicular occlusion and hyperkeratinization, with comedo formation, as well as microbial colonization of pilosebaceous follicles by Propionibacterium acnes, leading to inflammatory papules and pustules. Conventional treatments for acne include salicylic acid, benzoyl peroxide, retinoids, and antibiotics (topical and systemic). However, symptoms may not always improve, and patients may have adverse reactions to conventional treatments and thus seek alternative treatments. Antibiotic resistance in P. acnes also has been rising, thus promoting the need to look at alternative therapies. (2)

Dietary and Lifestyle Factors
The influence of diet on acne has been debated for decades. One review of the literature looking at the evidence for diet, face washing, and sunlight exposure in acne management concluded that the evidence is incomplete at best. (3) Another review did not support any link between acne and foods such as dairy products, chocolate, and fatty foods. (4) However, with more recent focus on diet and nutritional supplements, emerging research suggests that diet may be a factor, particularly in mediating the inflammation and oxidative stress of the acne process. (5)(6)(7)

Western diets, with characteristically high glycemic indices, can elevate insulin and insulin-like growth factor 1 levels acutely and chronically. (5) These hormones stimulate adrenal and gonadal androgen production, leading to increased sebum production and acne. Frequent consumption of high-glycemic-index carbohydrates may repeatedly expose adolescents to acute hyperinsulinemia. Therefore, a low-glycemic-load diet may have a beneficial effect on acne. (6)

A review article by Berra and Rizzo (7) also supported a possible correlation between a high glycemic diet and acne, and suggested an improvement in acne after glycemic index and glycemic load were reduced. A randomized controlled trial of 43 male patients age 15 to 25 years found that a low-glycemic-load diet improved acne lesions and reduced weight and BMI. (8) Weight loss is known to decrease circulating androgen and insulin levels; thus, it was unclear if improvement in acne was due to the dietary differences, the weight reduction, or both.

A cross-sectional, self-report study of 47,355 nurses revealed that intake of milk during adolescence was associated with history of teenage acne. (9) The authors also prospectively examined the effects of milk intake and acne in the children of these nurses and found that higher milk consumption, regardless of fat content, was associated with acne. (10)(11) The authors speculated that milk (whole or nonfat) contains hormones and bioactive molecules, such as androgens, progesterone, and insulin-like growth factor 1, that can have an acne-stimulating effect. (12)

These cohort studies, however, can only suggest correlation, not causation. Stress also has been blamed as a trigger for acne flares. Two independent groups of researchers studied high school and university students and found that increased stress levels during examination periods correlated with increased acne severity. (13)(14) The mechanism by which stress negatively affects acne is unclear, but practicing mind–body therapies, such as yoga, to reduce stress may be beneficial for patients who have acne as well.

Abbreviations
EFAs: essential fatty acid
LTB4: leukotriene B4

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Nutritional Supplements and Phytochemicals

Arachidonic acid (omega-6 fatty acid, which is a major part of a Western diet) is a precursor to the manufacture of proinflammatory leukotriene B4 (LTB4). The involvement of LTB4 in the pathogenesis of acne has been described; a study looking at the administration of a novel LTB4 blocker found a 70% reduction in inflammatory acne lesions. (15)

The anti-inflammatory properties of omega-3 essential fatty acids (EFAs), including LTB4 inhibition, are well known. (16) To the best of our knowledge, there are no studies that have looked at the direct effect of supplementation with omega-3 EFAs on acne, although a diet high in omega-3 EFAs may have a synergistic effect with a low-glycemic-load diet on improving acne. (6)(17)

Lactoferrin (a whey milk protein/iron-binding protein) as a dietary supplement also has been shown to decrease skin inflammation due to its broad antibacterial and anti-inflammatory activities. (18) Two trials, one an open-label, single-arm study and the other a double-blind, placebo-controlled study, looked at the efficacy and tolerability of lactoferrin in adolescents and young adults who had mild to moderate facial acne vulgaris. (19)(20) They found a significant reduction in the inflammatory acne lesion count in the lactoferrin group. The results suggest that dietary supplementation with bovine lactoferrin in mild to moderate acne vulgaris can decrease acne lesions.

Another nutritional supplement called APC (methionine-based zinc complex, chromium, and vitamins with antioxidants) was studied in an observational pilot study of 48 patients (age 15–35 years) who have acne. The oral form of this supplement was given thrice daily for 3 months. At the end of treatment (week 12), there was a statistically significant improvement in the global acne count, with a decrease in pustules and papules (P < .001). (21)

Resveratrol is a natural compound produced by some spermatophytes, such as grapes and other plants, that has been shown to be anti-inflammatory and active against several bacteria, including P. acnes. (22) A single-blind pilot study of 20 patients assessed the therapeutic effects of resveratrol on acne vulgaris. (23) Resveratrol gel was applied daily on the right side of the face for 60 days, compared with a control hydrogel on the left side of the face. There was a 53.75% mean reduction in the global acne grading system score on the resveratrol-treated sides of the face compared with 6.10% on the control sides.

Biochemical Therapies

Few herbal medicines have been evaluated systematically in clinical trials. Witch hazel (Hamamelis virginiana) bark has been used to treat acne because of its naturally astringent properties. (24) To date, no randomized trials have been conducted to substantiate the use of this agent, but it is used often in acne products.

Tea Tree Oil

Green tea extract and tea tree oil have been investigated in the treatment of acne. Tea tree oil is an essential oil of the native Australian tree Melaleuca alternifolia and has been shown to have antibacterial and antifungal properties. (25) A randomized, double-blind, placebo-controlled study investigated the efficacy of 5% topical tea tree oil gel in 60 patients (age 15–25 years) who had mild to moderate acne vulgaris. Total lesion count (TLC) and acne severity index (ASI) scores were used to determine efficacy of the treatment. (26) Tea tree oil gel was 3.55 times (for TLC score) and 5.75 times (for ASI score) more effective than placebo.

A single-blind, randomized clinical trial of 124 patients who had mild to moderate acne was conducted to evaluate the efficacy and skin tolerance of 5% tea tree oil with 5% benzoyl peroxide lotion. (27) After 3 months of treatment, both 5% tea tree oil and 5% benzoyl peroxide reduced acne significantly, but fewer adverse effects were reported with the use of tea tree oil (44% vs 79%). The onset of action was slower, however, in the tea tree oil therapy group.

Green tea has catechins, which are phytochemical phenolic compounds that have anti-inflammatory effects. Two studies assessed the efficacy of topical 2% green tea lotion (natural plant extract) in the treatment of mild to moderate acne vulgaris in adolescents and young adults. Topical 2% green tea lotion was found to be significantly effective for mild to moderate acne vulgaris. (26)(28)(29) Several other natural ingredients, such as colloidal oatmeal, feverfew, licorice, aloe vera, chamomile, curcumin, soy, coffebeery, mushroom extracts, pine bark extract, vitamin E, vitamin C, and niacinamide, have antioxidant, anti-inflammatory, or moisturizing properties; thus, these ingredients may be effective adjuncts with other acne therapies to decrease the erythema associated with inflammatory acne. (30)

Ayurvedic Herbs

Two randomized, double-blind, placebo-controlled clinical studies exploring the efficacy of ayurvedic treatment (a Hindu system of traditional medicine) in acne have been published. These studies indicate that some ayurvedic remedies might be effective for acne. One study demonstrated that the combination of an oral ayurvedic preparation and a topical ayurvedic, multicomponent preparation (cream or gel) was more efficacious in treating acne than oral therapy alone. (31) Another study
found that treatment with an oral preparation of sunder vati resulted in a significant reduction in acne lesion count and was well tolerated. Treatment with three other oral formulations that were studied failed to show any improvement. (32)

**Traditional Chinese Medicine/Acupuncture**

A few small studies in adults have looked at the effectiveness of traditional Chinese herbs and acupuncture for the treatment of acne and found them to be promising. A double-blind, controlled trial evaluated the efficacy of ah shi point and general acupuncture point treatment of acne vulgaris in 36 adults. (33) Ah shi point acupuncture involves inserting a needle at painful or pathologic sites (papules and nodules of acne) to directly reduce inflammation of the acne site. After 12 treatment sessions, there was a significant reduction in the inflammatory acne lesion counts, the scores on a quality of life scale (Skindex-29, a self-administered questionnaire designed to measure the effects of skin diseases on patients’ quality of life), and the subjective symptom scores from baseline in both groups.

A Chinese herbal compound, compound oldenlandis mixture, was compared with angelica and sophora root pills in 120 patients who had acne, and the patients were found to have 73% improvement in acne lesions. (34) A meta-analysis evaluated the therapeutic effect and safety of acne treatment with acupuncture and moxibustion compared with routine Western medicine. It was concluded that comprehensive acupuncture/moxibustion was safe and effective, and possibly better than routine Western medicine, for the treatment of acne. (35)

**Light Therapy**

Acne therapy using various light sources that target *Propionibacterium* species seems promising. The development of infrared nonablative lasers to target sebaceous glands has resulted in the creation of a number of laser, light, and radiofrequency devices for acne. The main light and laser therapies used to treat acne include intense pulsed light; pulsed dye lasers; and broad-spectrum, continuous-wave, blue and red visible light. A few studies have shown some positive results, and light and laser treatments may be effective and safe for acne, although more studies are needed. (36)(37)

**Summary**

- Preliminary evidence and small pilot studies, mostly in young adults, suggest that complementary and alternative therapies may have some value in the treatment of acne.
- Some emerging data suggest that dietary modification (in particular, decreasing the glycemic index and glycemic load), as well as supplementation with omega-3 essential fatty acids, may be beneficial in acne management.
- A few small pilot studies have reported efficacy of some herbs and nutritional supplements, traditional Chinese medicine, ayurvedic herbs, and phototherapy in the treatment of acne.
- More research and larger clinical trials are warranted in the evaluation of the effectiveness of complementary therapies in treating acne.

**Note:** To view the references for this article, visit the February issue at [http://pedsinreview.aappublications.org](http://pedsinreview.aappublications.org) and click on the “Complementary, Holistic, and Integrative Medicine” article.
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