The puzzling relationship between diet and acne

By: LILY TALAKOUB, M.D., Dermatology News Digital Network

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The relationship between acne and diet has been an ongoing debate. There are no meta-analyses, randomized controlled clinical studies, or well-designed scientific trials that follow evidence-based guidelines to elucidate a cause-effect relationship. However, for decades anecdotal evidence has shown that acne and insulin resistance, such as that seen in patients with polycystic ovarian syndrome (PCOS), are highly linked. Now the literature points to the growing relationship between nutrition and the prevalence of acne, especially to glycemic index and the consumption of dairy.

Glycemic index is a ranking system based on the quality and quantity of consumed carbohydrates and its ability to raise blood sugar levels. Foods with high glycemic indices such as potatoes, bread, chips, and pasta, require more insulin to maintain blood glucose levels within the normal range. High-glycemic diets that are prevalent in the United States not only lead to insulin resistance, diabetes, obesity, and heart disease but also to acne.

Several studies have looked at the glycemic load, insulin sensitivity, and hormonal mediators correlating to acne (Am. J. Clin. Nutr. 2007; 86:107-15; J. Dermatol. Sci. 2008;50:41-52). Foods with a high-glycemic index may contribute to acne by elevating serum insulin concentrations (which can stimulate sebocyte proliferation and sebum production), suppress sex hormone-binding globulin (SHBG) concentrations, and raise androgen concentrations. On the contrary, low-glycemic-index foods increase SHBG and reduce androgen levels; this is of great importance because higher SHBG levels are associated with lower acne severity. Consumption of fat and carbohydrates increases sebum production and affects sebum composition, ultimately encouraging acne production (Br. J. Dermatol. 1967;79:119-21).

A new study by Anna Di Landro et al. published in the December 2012 found a link between acne and the consumption of milk, particularly in those drinking skim milk and more than three servings of milk per week (J. Am. Acad. Dermatol. 2012;67:1129-35).

Dr. Di Landro et al. also found that the consumption of fish had a protective effect on acne. This interesting finding points to the larger issue of acne developing in ethnic populations that immigrate to the United States. Population studies have shown that non-Western diets have a reduced incidence of acne. Western diets are deficient in long-chain omega-3 fatty acids. The ratio of omega-6 to omega-3 fatty acids in our Western diet...
is 10:1 to 20:1, vs. 3:1 to 2:1 in a non-Western diet. Omega-6 fatty acids in increased concentrations induce proinflammatory mediators and have been associated with the development of inflammatory acne. Western diets with high consumption of seafood have high levels of omega-3 fatty acids and have shown to decrease inflammatory mediators in the skin (Arch. Dermatol. 2003;139:941-2).

In my clinic, the ethnic populations that immigrate to the United States often develop acne to a greater extent than they had in their native countries. Although factors including stress, hormonal differences in foods, and pollution can be confounding factors, we must not ignore the Western diet that these populations adapt to is higher in refined sugars and carbohydrates and lower in vegetables and lean protein. Every acne patient in my clinic is asked to complete a nutritional questionnaire discussing the intake of fast food, carbohydrates, juice, sodas, and processed sugar. We have noticed that acne improves clinically and is more responsive to traditional acne medications when patients reduce their consumption of processed sugars and dairy and increase their intake of lean protein. Similarly, our PCOS patients who are treated with medications such as metformin, which improves the body’s ability to regulate blood glucose levels, have improvements in their acne. So, is acne a marker for early insulin resistance?

The underlying etiology of acne is multifactorial, although now we can appreciate diet as one of the causative factors. Although there is no direct correlation between obesity or insulin resistance and the prevalence of acne, a low glycemic index diet in combination with topical and systemic acne medications can be a powerful method of treating acne. Nutritional counseling is an adjunct educational service we should provide to our patients in addition to skin care advice and medical treatments for acne.

No single food directly causes acne, but a balanced diet can alter its severity. Encouraging our patients to eat a variety of fruits and vegetables, lean protein, and healthy fats can prevent the inflammation seen with acne and also can protect against cardiovascular disease, type II diabetes, and even obesity.

It is unfortunate that the medical education system in the United States has no formal nutrition education. Nearly every field of medicine including internal medicine, cardiology, endocrinology, allergy, pediatrics, obstetrics and gynecology, surgery, and not the least, dermatology, is influenced in some realm by nutrition. As the population diversifies, so will the importance of dietary guidance. We need to educate ourselves and our residents-in-training to better appreciate the symbiotic relationship between diet and skin health and to provide this guidance to our patients.

Dr. Talakoub is in private practice in McLean, Va.

Do you have questions about treating patients with dark skin? If so, send them to sknews@elsevier.com.

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