



What Role Does Diet Play in the Management of Nickel Allergy?

THERE IS NO ESTABLISHED recommended intake for nickel. The nutritional importance or biochemical function of nickel in humans has not been clearly established. Data were insufficient to set estimated average requirements, recommended daily allowances, or adequate intakes. The upper tolerable intake level for nickel is based on animal data. However, the data review indicated a need for continued study of this element to determine specific metabolic roles, identify sensitive indicators, and more fully characterize nickel's functions in human health.¹

Nickel is a well-known cause of contact dermatitis. The prevalence of nickel sensitivity is rising, according to the American Academy of Dermatology, and it is estimated that more than 18% percent of people in North America are sensitive to nickel, including 11 million children in the United States.² Nickel-sensitive clients may experience an intensely itchy rash in response to prolonged and repeated dermal contact with nickel-containing objects such as jewelry (especially earrings) and other consumer products containing nickel, or in occupations where metal contact is frequent. Contact allergy to nickel is diagnosed by a patch test. After an individual is sensitized to nickel, further contact with the metal may produce a reaction.

The following information from the Academy of Nutrition and Dietetics' publication *The Health Professionals*

*Guide to Food Allergies and Intolerances*³ describes details regarding nickel allergy of interest to registered dietitian nutritionists. Food allergy caused by nickel was first suspected when dermatologists noticed that some people exhibited symptoms of dermatitis on skin surfaces not in contact with any known allergen. Dermatologists suspected that the allergenic source might be in something ingested and looked for sources of known contact allergens, such as nickel, in commonly eaten foods.

The level of nickel in foods varies with the variety of the plant species and with the nickel content of the soil in which the plant was grown or, in the case of seafood, of the aquatic environment. In addition, different laboratories employ a variety of tests to detect nickel in food; therefore, frequently the data from one source can disagree markedly with that from another. In most studies, the richest sources of dietary nickel are found in nuts, dried peas and beans, whole grains, and chocolate. In addition, processing a food can increase its nickel content. For example, minute traces of nickel from metal grinders used in milling flour can increase the nickel content in flour considerably, and stainless-steel cookware will increase the nickel in the food cooked in it.

Most ingested nickel remains unabsorbed and excreted in the feces. Usually less than 10% of the nickel in food is absorbed, but this amount increases in people with iron deficiencies and in lactating mothers. Nickel and iron use the same transport system to cross the intestinal mucosa; so if iron is being transported, nickel is excluded. Accordingly, individuals who are sensitive to nickel should include iron-rich foods in their diet. Because a certain amount of nickel is present in nearly all foods, a nickel-free diet is not possible.

Clinical studies suggest that some nickel-sensitive people benefit from avoiding foods with high amounts of nickel. However, opinions differ on what constitutes a nickel-restricted diet. In one research study cited by *The Health Professionals Guide to Food Allergies and Intolerances*,³ an oral dose of nickel (as nickel sulfate) as low as 0.6 mg produced a positive reaction in some nickel-sensitive people. Another cited report indicated that 2.5 mg was required to induce a flare-up. Because the levels of nickel required to induce a reaction have varied widely in different studies, it is difficult to determine a "safe level" of dietary nickel for nickel sensitive people. Guidelines addressing a nickel-restricted diet are found in the Academy's downloadable publication, *Food Allergies and Intolerances: Client Education Tools for Dietary Management*.⁴ Following the guidelines for 4 to 6 weeks is often enough to determine whether a nickel-restricted diet improves symptoms.

References

1. Institute of Medicine. In: Hellwig JP, Otten JJ, eds. *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements*. Washington, DC: The National Academies Press; 2006.
2. American Academy of Dermatology. Position statement on nickel sensitivity. <https://www.aad.org/forms/policies/uploads/ps/ps-nickel%20sensitivity.pdf>. Accessed January 2, 2017.
3. Joneja JV. *The Health Professionals Guide to Food Allergies and Intolerances*. Chicago, IL: Academy of Nutrition and Dietetics; 2012.
4. Joneja JV. *Food Allergies and Intolerances: Client Education Tools for Dietary Management*. Chicago, IL: Academy of Nutrition and Dietetics; 2012.

Additional Resource

Food Allergies: Cutting Through the Clutter (Modules 1-4). To receive a certificate associated with this online training program, all modules and related tests must first be completed and a subsequent final post-test exam in the last module must be passed with an 80% score. <http://www.eatrightstore.org/collections/food-allergies-modules>

This article was written by **Eleese Cunningham, RDN**, of the Academy of Nutrition and Dietetics' Knowledge Center Team, Chicago, IL. Academy members may send an e-mail to knowledge@eatright.org

<http://dx.doi.org/10.1016/j.jand.2017.01.001>