The Asthma & Allergy Center

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Nickel Allergy

As a group, metals are the most common contact allergens. Nickel is the most common cause of metal allergy, and ranks as the most common of all screening allergens. The latest data shows that nickel was positive in 14.2% of 3429 patients tested over a two-year period. Allergic sensitivity to a metal is usually highly specific and a cross-sensitivity reaction with other metals is uncommon. Many reports of cross-reactions between metals are actually co-reactions, which occur because of simultaneous exposure to two or more metals.

Allergic contact dermatitis to nickel and other metals generally occur only if the metal salts are in solution, as occurs with perspiration or exposure with bodily fluids. Stainless steel is an iron-based alloy usually containing nickel, chromium, and other trace metals. The addition of nickel is said to create a hard, smooth surface, which increases resistance to corrosion, wear, and abrasion. Some stainless steels contain as much as 26% chromium; others contain as much as 37% nickel. Contact with stainless steel containing nickel usually does not immediately produce nickel dermatitis in a nickel-sensitive person, because the alloy binds the nickel so firmly that sweat cannot easily liberate nickel salts. In cost cases with chronic exposure, however, eventually enough of the allergen will penetrate the skin and allergic contact dermatitis occurs. Plated metals consist of electro deposited metallic coatings containing various metals and alloys with widely varying physical and chemical properties. Many alloys and nickel liners under gold, silver, or chrome plating give positive reactions in test subjects, therefore plating will not prevent nickel allergy in most cases. Nickel-plated objects are pinkish white, whereas chrome plating imparts a bluish white color.

Sources of Nickel Exposure

Most nickel exposure comes from obvious sources, especially jewelry, clothing, fasteners and decorations, etc. However, there are some unusual or unexpected sources of potential nickel exposure of which one should be aware. Several European studies have stated that nickel and chromium present in detergents are factors in the production of dermatitis, particularly hand eczema in individuals sensitized to these metals. The source of nickel in American detergent compounds is the raw materials used in the manufacturing process. Nickel may also be present in cosmetics as a contaminant. Since facial and especially the eyelid skin is very sensitive, it would seem possible that metals in cosmetics could cause allergic contact dermatitis in very sensitive individuals. Eye shadows, and possibly other cosmetics, should be considered as occult causes of dermatitis in nickel allergic people. Much more nickel is released from coins in water and synthetic sweat than from nickel-plated metal indicating that nickel-containing coins may be a relevant source of allergen in everyday life. In the USA , five-cent pieces still contain nickel.

Ear Piercing and Nickel Allergy

Many people become sensitized to nickel when their ears are pierced because injury to the skin from mechanical, physical, or chemical agents followed by intimate contact with a nickel-plated earring that favors the development of allergic dermatitis. Ears should be pierced with stainless-steel instruments or needles, and only stainless-steel earrings should be worn for at least 3 weeks until the pierced opening is completely healed. In a Finnish study of 700 teenagers, 31% with pierced ears were allergic to nickel but only 2% of teens without pierced ears were allergic. Nickel-sensitive persons must wear stainless steel or titanium earrings or the more expensive gold earrings with less free nickel. Some individuals coat their “favorite” dermatitis-producing earrings with nail lacquer and can thus wear the earrings for a few hours without symptoms.

Dietary Role in Nickel Dermatitis

Even today, the role of dietary nickel is causing and maintaining nickel dermatitis is vastly under appreciated. Enough nickel in the diet of a nickel-sensitive person can provoke dermatitis. The hands are the most common sites for systemic nickel dermatitis. Other body areas may be affected as well.

Evidence for the role of dietary nickel includes:

- Flare of eczema and/or patch test sites upon oral nickel challenge.
- Improvement of dermatitis with a reduced nickel diet.
- Improvement of dermatitis by oral disulfiram, which chelates nickel and increases its excretion.
- Preliminary suggestions that children with orthodontic braces who are therefore exposed to low continuous levels of ingested nickel may have less subsequent nickel allergy.

The normal daily intake of nickel by American adults is about 0.3 to 0.6mg. About 1 to 10% of nickel in food is absorbed in the gastrointestinal tract and the remainder is excreted. The nickel content of food is partially determined by the components of the soil, in which the food was grown, pesticides used on it and the equipment used in the handling of the food.

Nickel is food may vary considerably from region to region. Certain foods are routinely high in nickel content. Legumes, nuts, grains, potatoes, chocolate and fish are among the food high in nickel. In summary, ingested nickel either from food beverages or cooking utensils can cause a flare of dermatitis is some individuals. Accordingly, motivated persons may see improvement if they can reduce their ingestion of nickel through dietary changes.

Occupational Nickel Dermatitis

While nickel dermatitis in women generally is due to jewelry or clothing contact, in men most nickel dermatitis is attributed to workplace exposure. Commonly affected workers include hairdressers, retail clerks, food service workers, cleaners, and metal workers. Vinyl gloves appear to be more protective against nickel penetration than rubber gloves.