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A cobalt spot test was useful in the diagnostic work-up of a cobalt allergic patient suffering from oral hypersensitivity to cobalt

To the Editor: A 67-year-old woman was referred to our university clinic suspected of having burning mouth syndrome. Her antecedent medical history included ankylosing spondylitis, chronic fungal infections in her esophagus, and atrial fibrillation. No new medications had been introduced recently. Two months earlier, she began using new dental implants in both the upper and lower part of her mouth. Her old implants had functioned for 25 years; the patient did not have any complaints. Following insertion of new implants, the patient began to suffer from a constant and severe burning sensitization in the oral mucosa and tongue and at her lips. She had begun taking sedative medication to sleep, anti-nausea medication against chronic complaints of nausea, and had lost weight (5 kg). A private office dermatologist had treated her with topical (nystatin $\times 4$) and systemic (fluconazole 50 mg $\times 1$) fungal medications, but this did not relieve her symptoms. Furthermore, she had visited her dental technician several times to enhance the fit of the implant. Upon clinical examination, inflammation was visible at the site of contact between the implant and the buccal mucosa. Blood samples as well as fungal cultures and microscopic examinations were all negative. She was treated with topical corticosteroids and the implants were



Fig 1. *Left*, cotton stick: positive test result of cobalt spot test indicated by red coloration. *Right*, cotton stick: reference as indicated by yellow coloration, that is, when cobalt spot test is negative and no cobalt is released.

removed. Patch testing with the European baseline series as well as gold, platinum, and iridium revealed 2+ positive reactions to nickel and cobalt. Dimethylglyoxime testing of the dental implants was negative. Cobalt spot testing showed red discoloration, which indicates cobalt release exceeding 10 ppm¹ (Fig 1). The cobalt content was 64%, according to data sheets from the producer. At 3 months' follow-up, symptoms had disappeared and to date new implants without cobalt have not caused problems.

This case report suggests that cobalt release from dental implants possibly resulted in an oral hypersensitivity reaction in a cobalt-allergic patient; it also shows that the recently developed cobalt spot test based on disodium-1-nitroso-2-naphthol-3,6-disulfonate may help dermatologists and dentists to rapidly and accurately determine cobalt release from suspected items. The test is comparable to the well-known DMG test for nickel release. One drop of a clear yellow solution is added on the tip of a cotton stick, which is then rubbed for 20 to 30 seconds against the metallic item in question for cobalt release. If the cotton changes color from yellow to red, it indicates that cobalt ions (>8.3 ppm) are released (Fig 1). To date no false-positive reactions have been identified when testing metals and alloys known not to contain cobalt. However, one cobalt-containing alloy, which elicited cobalt dermatitis in cobalt allergic patients, was negative upon cobalt gel testing.¹ The use of cobalt in dental implants is currently increasing globally. Thus the cobalt spot test (in 2010-2011 available from SmartHealth, Phoenix, AZ) may be useful in patients with oral complaints and concomitant cobalt allergy.

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Localized cutaneous argyria

To the Editor: A 31-year-old woman presented with a solitary, blue-gray papule on the medial aspect of her right elbow that clinically resembled a blue nevus. She had a family history of malignant melanoma in her mother, but no personal history of atypical nevi or malignancy. A punch biopsy was performed. On histologic examination, elastic and collagen fibers within the mid dermis appeared to be coated by fine, brown-black granules (Fig 1, A). Immediately deep to these fibers, histiocytes formed an ill-defined nodule. Brown-black granules were also identified within the cytoplasm of these histiocytes and coated the basement membrane of adjacent eccrine sweat glands (Fig 1, B). The histiocytes surrounded fragments of a crystalline material that resembled silica on polarized light examination (Fig 1, C). Dark-field microscopy highlighted the brown-black granules, confirming their mineral nature (Fig 2, A). Scanning electron microscopy with energy-dispersive spectroscopy demonstrated small, regular granules adherent to elastic and collagen fibers and showed that the granules were composed of silver and copper with admixed silica (Fig 2, B and C).

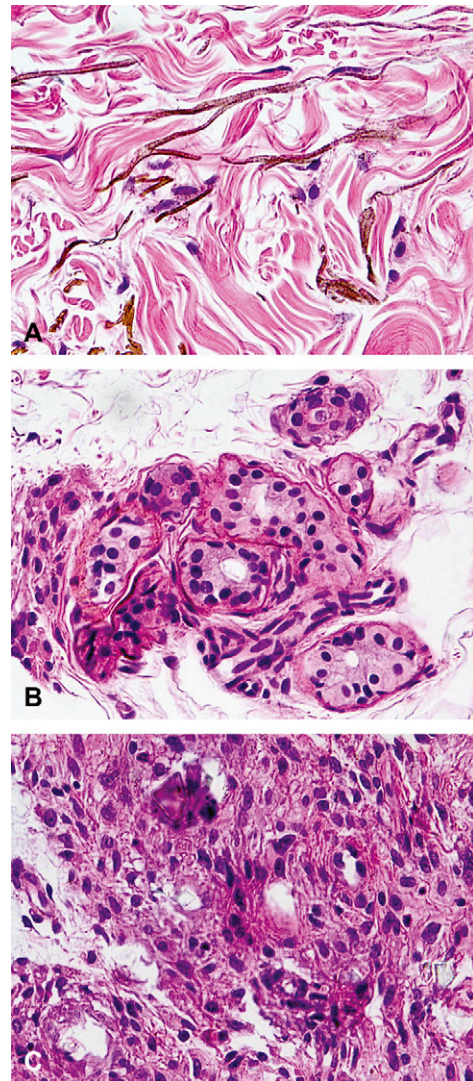


Fig 1. Brown-black granules coat dermal elastic and collagen fibers (A) and basement membrane of eccrine sweat glands (B). An adjacent ill-defined aggregate of histiocytes contains numerous crystalline, silica fragments (C). (Hematoxylin-eosin stain; original magnification: A, B, and C $\times 600$.)

Scanning electron microscopy with energy-dispersive spectroscopy is a useful tool in the evaluation of chemical elements within skin biopsies; it bombards the tissue with electrons, creating an image based on electron scatter and identifying elements based on unique and characteristic patterns of emitted x-rays. This technique has been critical in identifying the relationship between gadolinium and nephrogenic systemic fibrosis.¹ The combination of heavy metals and silica identified in the patient's biopsy specimen is compatible with the constituents of a mirror. On further discussion, the patient reported a recent, severe motor vehicle accident with damage to the driver's side rear-view mirror and