

LETTER TO THE EDITOR

CONTACT ALLERGIC DERMATITIS TO GOLD IN A TATTOO: A CASE REPORT

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The art of tattooing has increasing in recent decades. Allergic sensitivity to one of the pigments is the most frequent cause of dermatological reactions at the site of the tattoo. Gold is a new pigment used in tattooing, because of its bright yellow color and luster. Allergy to this metal is uncommon. To our knowledge, this is the first reported case of allergic contact dermatitis to gold in a tattoo.

The term tattoo derives from Polynesian "tatau". The art of tattooing has ancient origins; the first description of tattooed men dates back to 6,000 years ago and were discovered by archaeologists in Egypt, China, Siberia, Austria, and South America. The Bronze Age mummified body discovered in Austria, known as "the Similaun Mummy", had about fifty tattoos all over his body. In addition, some tools from the upper Paleolithic era (about 35,000 to 10,000 years BC) probably used to tattoo, such as needles and pigments, were also discovered.

Today tattoos are becoming part of mainstream culture. From recent statistics, only in Western countries, about eighty million people have at least one tattoo on their bodies. (1-5). It is well known that tattoos can cause many complications, including mainly local inflammation, infection and hypersensitivity. Allergic sensitivity to one of the pigments is the most frequent cause of these reactions.

We describe the case of young woman with contact allergic dermatitis to the gold contained in her tattoo.

Case report

A 29-years-old woman presented to the Dermatology Unit, S. Andrea Hospital, Rome because of a 2-week history of allergic dermatitis presenting with heat, pruritus, erythema and scaling, in the area of a coloured tattoo on her left arm. These lesions developed 2 months after tattooing (Fig. 1-2).

General physical examination was normal, and in particular there was no evidence of respiratory, cardiac, ocular or joint disease. Cutaneous examination revealed erythematous lesions localized to the gold pigmented areas.

The patch test was performed using the standard North American series test [containing DMDM hydantoin, bacitracin, mixed dialkyl thiourea, formaldehyde-releasing preservative, rubber antioxidant, glutaraldehyde 0.5%, bronopol, formaldehyde 1%, fragrance mix, propylene glycol 30%, 4-chloro-3,5-xyleneol, diazolidinylurea 1%, ethyleneurea/melamine formaldehyde mix 5%, disperse blue 106/124, mix ethyl acrylate, glyceryl monothioglycolate (GMTG), goldsodiumthiosulfate,

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Table I. *Composition of tattoo pigment colors.*

Color	Principal compositions
Black	Carbon(India ink), iron oxide, logwood
Blue	Cobalt aluminate, azure blue, cobalt blue, copper, phthalocyanine
Brown	Ochre(ferric oxide)
Green	Chromic oxide, lead chromate, phthalocyanine dyes, ferrocyanides, and ferricyanides
Violet Purple	Manganese ammonium pyrophosphate, various aluminum salts, dioxazine/carbazole
Red	Cinnabar/mercuric sulfide, cadmium red,iron oxide/common rust, naphthol-AS pigment hydrate)
White	Titanium dioxide, zinc oxide, barium sulfate, lead carbonate
Yellow	Cadmium yellow, ochres, curcuma yellow, chrome yellow (pbCrO ₄ ,often mixed with PbS)
Metallic gold	Gold
Henna	Henna dye and paraphenylenediamine(PPD)

**Fig. 1.** *Erythematous lesions and scratch marks on the tattoo.***Fig. 2.** *Enlargement of erythematous lesions and scratch marks on the tattoo.*

methyl methacrylate, cocamidopropylbetaine surfactant, benzocaine 5%, mercaptobenzothiazole 1%, colophony 20%, phenylenediamine 1%, imidazolidinyl urea 2%, cinnamic aldehyde 1%, lanoline alcohol 30%, carba mix 3%, neomycin sulfate 20%, thiuram mix 1%, ethylenediamine dihydrochloride 1%, epoxy resin 1%, quaternium-15 2%, butylphenoformaldehyde resin 1%, mercapto mix 1%, n-isopropyl-n-phenyl-4-phenylenediamine

0.1%, potassium dichromate 0.25%, balsam of Peru 25%, nickel sulphate 2.5%, me-isothiazolinone, parabeni mix 12%, euxyl 400, sesquiterpene lactone mix 0.1%, thimerosal, benzophenone 3%, BHA, tosylamide 10%, cobalt 1%, tixocortol-21-pivalate 0.1%, budesonide 0.01%, benzyl alcohol 1.0%, benzalkonium chloride 0.1%] and extended metal series (containing manganese ii, iv, and violet manganese, goldsodium thiosulphate “% and 0.5%,

titanium) on her back with the readings at 48 h and 72 h. Our patient showed positive patch test reactions to goldsodium thiosulfate 2% (+1), goldsodium thiosulfate 0.5% (+1) and nickel (+1) at 48 h. At 72 h she presented an increased sensibility to goldsodium thiosulfate 2% (++), goldsodium thiosulfate 0.5% (++) and nickel (+).

Treatment with systemic and topical corticosteroid therapy was instituted, with an improvement of the clinical lesions after 2 weeks.

CONCLUSION

Pigments, paints, inks used in all types of tattoos, from aesthetic to decorative, are classified as cosmetics, food coloring, or food additives. Nowadays, professional tattoos are often colorful and the size of pigment is extremely small, and professional tattoo artists use modern machines to put the tattoo pigment in the reticular dermis. Analysis of pigments contained in tattoos is important to understand the components of individual colors and especially to predict the probable allergies (Table I). Professional tattoo artists use different compounds to create tattoo pigments and several allergic reactions from decorative tattoos have been reported.

Several cutaneous disorders show a predilection site for tattooed skin. These reactions represent the first manifestation of the allergic disease or the accentuation of an existing reaction in the area of the tattoo (2-4, 6).

Patch testing is very important for diagnosis of allergens responsible for allergic contact dermatitis. Gold has been used for coinage, ink and jewelry since ancient times, and ultimately gold has been used for tattooing because of its bright yellow

color and luster. Tattoo allergy is rare, moreover gold allergy is also uncommon. The most common clinical manifestations of gold allergy are localized pruritus, edema, and exfoliative dermatitis.

In the literature, the reaction of skin to gold in the jewelry or in dental gold, has also been described. These reactions include acute inflammatory reaction, allergic hypersensitivity, granulomatous, lichenoid and pseudo lymphomatous types of histopathologic reaction.

To our knowledge, this is the first reported case of allergic contact dermatitis to gold used in a tattoo. To treat allergic contact dermatitis to tattoos, some cases resolve with topical or intralesional steroids, but permanent removal may be necessary.

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