



TATTOOS AND PIERCINGS

Tattoos and piercings have become increasingly popular since World War II. Several different adverse reactions can result from getting a tattoo or a piercing.

TATTOOS

Adverse reactions to tattoo inks, although uncommon, occur because tattoo artists often use a variety of components to create tattoo pigments. Most ink pigments become encapsulated in fibrous tissue after injection into the dermis and are less reactive, histologically; however, several allergic reactions can occur as a result of these additives. Reactions can manifest themselves in several ways including allergic contact dermatitis and photoallergic dermatitis. Tattoo ink reactions can be classified as:

- acute inflammatory reactions
- allergic hypersensitivities
- Granulomatous, lichenoid, and pseudolymphomatous types of reactions.

The most common clinical manifestations of ink allergy are pruritus, localized edema, an eczematous eruption with serous drainage, or rarely an exfoliative dermatitis. They may also appear thickened, and papules or plaques may be seen, rarely. Some well-known components of tattoo ink classically cause specific types of reactions — see Table 1 for details. Professional artists often incorporate organic dyes, mixed with insoluble metallic elements. They have a propensity to mix pigments to achieve a desired color, and this often increases the risk of an adverse reaction to the tattoo pigments. Metallic elements including aluminum, iron, calcium, titanium, silicon, mercury,

and cadmium have been found in red dyes, which could cause allergic reactions. Opposed to this, amateur tattoo artists tend to use elemental carbon particles, compiled from cigarette ash, pencil particles, graphite, or India ink.

Granulomatous and lichenoid hypersensitivity reactions are less common than eczematous reactions. Granulomatous reactions are often associated with red pigment that may contain mercury.

A person with an allergic reaction to tattoo ink may present requesting removal via the Q-switched laser. Q-switched laser treatment is not indicated for removing tattoos that show signs of allergic reactions. In some cases, such laser treatment may lead to hypersensitivity after the use of the Q-switched laser, as light from such a laser can also stimulate an allergic response.

PIERCINGS

Body piercing has been practiced in various forms since ancient times throughout the world. Many things can go wrong with piercings, and there have been reports of high rates of complications in patients who choose to get piercings. Risks of piercings include allergic reaction to the metal in the piercing—particularly nickel and infection (bacterial or viral), particularly from *Staphylococcus aureus*, Group A *Streptococcus*, and *Pseudomonas* species. Viral infections may include hepatitis B, hepatitis C, and potentially HIV. Excess scar tissue, including keloid formation, can also occur.

When removed, piercings may leave a hole or scar. Edema and delays in healing can result from trauma such as tearing, friction, or bumping of the piercing site. Oral trauma, including recession of gingival tissue and dental fracture and wear, can result from lip and/or intra-oral ornaments.

It is important for people to select a piercing studio that complies with proper hygiene and autoclaving of instruments between patients to minimize these risks.

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Table 1 – COMPOSITION OF TATTOO PIGMENTS		
Tattoo Ink / Pigment Color	Ingredient	Comments and Relevant Information
Black	Iron Oxide Carbon Logwood	<ul style="list-style-type: none"> • Natural black pigment is made from magnetite crystals, powdered jet, bone black, and carbon. • India ink is often made of black pigment from carbon. • Logwood is extracted from <i>Hematoxylon campechisnum</i> in Central America and the West Indies. • Rarely are black tattoo pigments associated with allergic reaction. • Amateur tattoos are frequently black and thus less commonly cause allergic reactions.
Brown	Ochre (Ferric oxide)	<ul style="list-style-type: none"> • Ochre is composed of ferric oxides mixed with clay. • Heated ochre changes from yellow to a red hue.
Red	Cinnabar /Mercuric sulfide Cadmium Red Iron Oxide/ Common Rust Naphthol-AS pigment	<ul style="list-style-type: none"> • Most commonly reactions occur to red pigments that may be caused by a variety of components, especially mercuric sulfide (cinnabar). Often these are lichenoid reactions. • Cinnabar and cadmium pigments are toxic. • Naphthol red is least reported to cause reactions. • In 1976, the Food and Drug Administration limited mercury in tattoo dyes to 3 ppm. Despite this restriction, allergic reactions to the red pigments still occur (28). • Patch testing for mercuric chloride may show a positive reaction but is not reliable for cinnabar.
Yellow	Cadmium Yellow Ochres Curcuma Yellow Chrome Yellow (PbCrO ₄ , often mixed with PbS)	<ul style="list-style-type: none"> • Yellow pigments rarely cause reactions, but will more often cause a photo-aggravated/toxic reactions due to cadmium sulfide (a light-sensitive material), leading to edema and erythema. • Red tattoos sometimes have a cadmium additive used to brighten the red pigment; these have also been associated with photo-aggravated reaction. • Curcuma is derived from tumeric or curcumin.
Green	Chromic oxide (Casalis Green or Anadomis Green) Lead chromate Phthalocyanine dyes Ferrocyanides and Ferricyanides	<ul style="list-style-type: none"> • Greens pigments may be mixtures, such as potassium ferrocyanide (yellow or red) and ferric ferrocyanide (Prussian Blue). • Allergies to green and light-blue pigments are less common but when they do occur they are often related to chromium, aluminum or chloride cobalt additives. • Chromium has been associated with local eczematous reactions, hand eczema and generalized eczematous eruptions. • Patch testing may be positive for 0.5% potassium dichromate.
Blue	Azure Blue Cobalt Blue Copper phthalocyanine Cobalt aluminate	<ul style="list-style-type: none"> • Blue pigments from minerals include copper carbonate, sodium aluminum silicate (lapis lazuli), calcium copper silicate (Egyptian Blue), other cobalt aluminum oxides and chromium oxides. • The blues and greens least likely to cause allergic reaction contain copper phthalocyanine which is more stable than cobalt and are FDA approved for use in contact lenses, infant toys and furniture.
Violet (purple)	Manganese ammonium pyrophosphate	<ul style="list-style-type: none"> • Some purple pigments, particularly bright magentas are photo-reactive and lose their color after prolonged exposure to light. • The most stable purple pigments contain dioxazine and carbazole.

	Various aluminum salts Dioxazine/carbazole	
White	Lead Carbonate Titanium dioxide Barium Sulfate Zinc Oxide	<ul style="list-style-type: none"> • White pigment may be used alone or to dilute the intensity of other pigments. • There are no described allergic reactions to titanium oxides, thus making them one of the least reactive white pigments.
Henna	Henna dye and paraphenylenediamine (PPD)	<ul style="list-style-type: none"> • Temporary henna tattoos create a brownish stain to when henna dye is painted onto the skin. • Henna itself is safe. • PPD, a common industrial allergen, is often mixed into temporary henna tattoos and can cause a contact dermatitis. It is also used as a textile dye.