

Short Communication

Occupational dermatitis in a silk-screen maker

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In silk-screen printing, ink is squeezed through the open meshes of a screen carrying an image, thus transferring the image to the surface below (1, 2). Silk has been replaced by nylon, Dacron®, and polyesters (3). Previously, all the stencils were prepared manually, but now indirect photo-mechanical processing and photo-composition are widely used (2). Thus are printed decals,

posters, wallpaper, glass, clothing, printed circuit boards, skis, surfboards, and credit cards (4).

Case Report

A 40-year-old man consulted us for an itchy, vesicular eczema on the palms, backs and sides of the fingers, and wrists, which had persisted for 2 months (Fig. 1). The dermatitis responded to a corticosteroid ointment but recurred. It was clearly related to his work, which was making stencils for printing athletic shirts, during which he came into contact with Saatigraf® (Saati, Italy). This was a UV-curable aqueous emulsion of acrylates and methacrylates.

At the site of the image, the emulsion does not polymerize with UV light and is then rinsed off with water, leaving those meshes open. The resulting stencil was subsequently used for printing on paper with a water-soluble ink, different stencils being used in turn to obtain different colors. The image was then transferred from the paper onto the fabric by means of heat. The patient's job consisted of rinsing off the UV-irradiated screens, which he had been doing with his bare hands and a rag for 2 years. Fig. 2 illustrates this process. He had suffered from eczema as a child and his mother and daughter had eczema and asthma.

Patch test results were as follows.

	D2	D4
Standard series		
epoxy resin (1% pet.)	++	++
Acrylates series		
ethylene glycol dimethacrylate (2% pet.)	++	++
BIS-GMA (epoxy acrylate) (2% pet.)	++	++
Own materials		
Saatigraf 3034® (semi-open test)	++	++
tripropylene glycol diacrylate (1%, 0.1%, 0.01%)	+	+

He had no more problems since avoiding contact with Saatigraf®. To do this, he wears Camatril Velours® (KCL, Germany) plastic gloves over cotton gloves. He is also using a scraper instead of a rag to clean the screen.



Fig. 1. Occupational dermatitis on the fingers and wrists in a silk-screen maker due to (meth)acrylate derivatives.

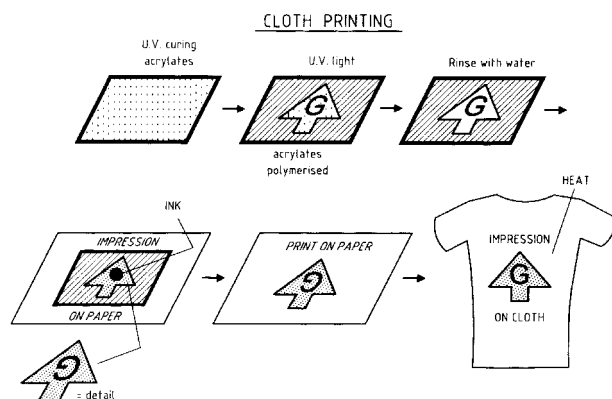


Fig. 2. The silk-screen process used in textile printing.

Discussion

The 3 essential ingredients of UV-curable emulsion are: UV-reactive prepolymer; thinner, usually multifunctional acrylates; and photo initiator. Our patient was allergic to ethylene glycol dimethacrylate (EGDMA) and BIS-GMA, as well as to epoxy resin. Saatigraf® contained a bifunctional aromatic acrylate, corresponding structurally to BIS-GMA, and tripropylene glycol diacrylate (TPGDA, CAS 42978-66-5). TPGDA was also positive. Cross-reactivity between this bifunctional aromatic acrylate, BIS-GMA and also epoxy resin seems possible. The reaction to EDGMA, which is commonly used in printing, might be either a cross-reaction or a concomitant reaction. Jolanki et al. (1) found acrylates other than those mentioned on the material safety data sheets of 40 products.

Contact allergy to the inks used in silk screening was first reported in 1986 (2). This patient reacted to a UV-curable ink, tripropylene glycol diacrylate (TPGDA), as did our patient, and also to pentaerythritol triacrylate (PETA). The 2nd case reported (5) concerned a silk-screen printer allergic to butanediol diacrylate (BUDA), trimethylol propane triacrylate (TMPTA), pentaerythritol triacrylate (PETA), and the UV-curable ink. TMPTA and PETA were found in the ink, but not BUDA. Jolanki et al. (1) reported the case of a woman who became allergic to triglycidyl isocyanurate (TGIC), diaminodiphenylmethane (DDM), and hydroxyethyl methacrylate (2-HEMA), among other acrylics and several epoxy resins. TGIC was present in an epoxy acrylate ink. DDM was present in a DGEBA-type epoxy resin ink. 2-HEMA was present in a UV-curable epoxy acrylate ink.

References

1. Jolanki R, Kanerva L, Estlander T et al. Concomitant sensitisation to triglycidyl isocyanurate, diaminodiphenylmethane and 2-hydroxyethyl methacrylate from silk-screen printing coatings in the manufacture of circuit boards. *Contact Dermatitis* 1994; 30: 12–15.
2. Nethercott J, Nosal R. Contact dermatitis in printing tradesmen. *Contact Dermatitis* 1986; 14: 280–287.
3. Adams R M. Silk-screening workers. In: *Occupational skin disease*. New York: Grune & Stratton, 1983: 438–439.
4. Géraut C. Imprimeurs (Industrie du livre et du papier). In: *L'essentiel des pathologies professionnelles*. Paris: Edition Marketing, 1995: 219.
5. Isaac M A, Thiboutot D M, Vasily D B et al. Contact dermatitis from printing inks. *Am J Contact Dermatitis* 1992; 3: 142–144.