

- Rimbaud P, Meynadier J, Guilhou J J et al. A study of immunity to cellular mediation in psoriasis. *Bull Soc Franc Dermatol Syph* 1973; 1: 477-478.
- Burden A D, Muston H, Beck M H. Intolerance and contact allergy to tar and dithranol in psoriasis. *Contact Dermatitis* 1994; 31: 185-186.
- Burden A D, Stapleton M, Beck M H. Dithranol allergy: fact or fiction? *Contact Dermatitis* 1992; 27: 291-293.
- Burden A D, Beck M H. Contact hypersensitivity to topical corticosteroids. *Br J Dermatol* 1992; 127: 497-500.
- Bruynzeel D P, Hol C W, Nieboer C. Allergic contact dermatitis to calcipotriol. *Br J Dermatol* 1992; 127: 66.
- Husen B M, Wollenweber E, Senff H, Post B. Propolis allergy. *Contact Dermatitis* 1987; 17: 163-170.
- Barile M, Cozzani E, Anonide A, Usiglio D, Burroni A, Guerrera M. Is contact allergy rare in psoriatics? *Contact Dermatitis* 1996; 35: 113-114.
- Flori M L, Perotti R, Mazzatenta C, Andreassi L. Cyclosporin in the treatment of severe allergic contact dermatitis. *J Eur Acad Dermatol Venereol* 1993; 2: 200-206.

Occupational allergic contact dermatitis caused by acrylic tri-cure glass ionomer

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Case Report

A 30-year-old qualified dental nurse developed occupational fingertip dermatitis typical of allergic contact dermatitis caused by acrylate compounds (1). Her dermatitis healed during vacations but relapsed on re-exposure. She was daily exposed to light-cured hybrid-glass ionomers (3M Dental Products Division, MN, USA; Table 1, Fig. 1), bonding agents, dentin primers and dental composite resins. She suspected that the light-cured hybrid-glass ionomer caused her symptoms, because her dermatitis had started within months of this ionomer being adopted for use.

Patch testing revealed that she had become sensitized to several acrylics, including 2-hydroxyethylmethacrylate (2-HEMA; Table 2), a well-known contact sensitizer in

dental materials. Her hybrid-glass ionomer primer and liquid also provoked an allergic patch test reaction (+++, 1% pet.), but not the powder (Table 2). The standard series and non-acrylics in the dental screening series (1) were negative.

Table 1. Hazardous chemicals of light-cured hybrid-glass ionomer components according to material safety data sheet

<i>Vitremer® glass ionomer primer (3M Dental Products Division, USA)</i>	
2-hydroxyethyl methacrylate (CAS 868-77-9) (2-HEMA)	37-41%
ethyl alcohol	44-48%
polymer of polycarboxy acid	11-14%
<i>Vitremer® glass ionomer liquid (3M Dental Products Division, USA)</i>	
2-hydroxyethyl methacrylate (CAS 868-77-9) (2-HEMA)	18-20%
polymer of polycarboxy acid	50-55%
<i>Vitremer® glass ionomer powder (3M Dental Products Division, USA)</i>	
fluoroaluminosilicate (CAS 65997-17-3)	95-98%
methacryloxypropyltrimethoxysilane (CAS 2530-85-0)	2-4%
ascorbic acid (CAS 50-81-7)	<0.08%

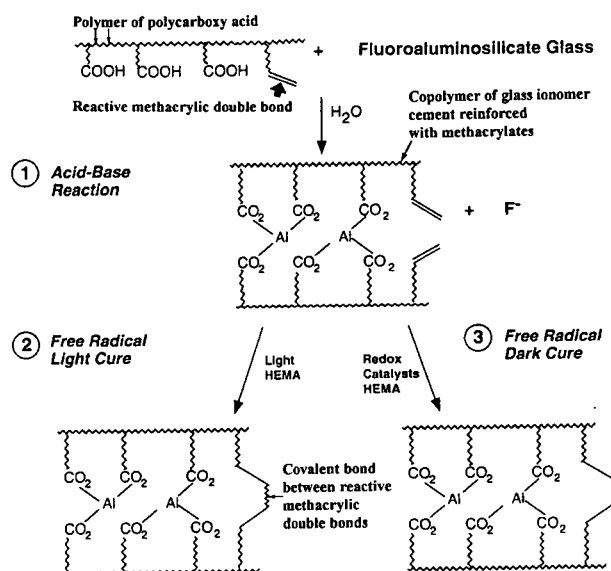


Fig. 1. Setting reactions of Vitremer® tri-cure glass ionomer, according to the manufacturer (3M Dental Products Division, MN, USA). Polymer of polycarboxy acid (a) in Vitremer® liquid reacts with fluoroaluminosilicate glass (b) in Vitremer® glass ionomer powder. Hardening takes place in a tri-cure reaction comprising an ① acid-base reaction, ② free radical light-cure reaction catalyzed by camphorquinone and a ③ free radical dark-cure reaction catalyzed by benzoyl peroxide. 2-hydroxyethyl methacrylate (HEMA) is added to the system to compensate water and is copolymerized to the acrylic polymer.

Table 2. Results of patch testing (2- and 4-day readings) with the (meth)acrylate series and components of Vitremer® glass ionomer products

(Meth)acrylate series	Abbreviation	Concentration % (w/w)	Result
ethyl acrylate	EA	0.1	+
butyl acrylate	BA	0.1	—
2-ethylhexyl acrylate	2-EHA	0.1	—
2-hydroxyethyl acrylate	2-HEA	0.1	—
2-hydroxypropyl acrylate	2-HPA	0.1	—
methyl methacrylate	MMA	2	+
ethyl methacrylate	EMA	2	+
n-butyl methacrylate	BMA	2	—
2-hydroxyethyl methacrylate	2-HEMA	2	++
2-hydroxypropyl methacrylate	2-HPMA	2	++
ethyleneglycol dimethacrylate	EGDMA	2	++
triethyleneglycol dimethacrylate	TREGDMA	2	?+
1,4-butanediol dimethacrylate	BUDMA	2	—
urethane dimethacrylate	UEDMA	2	—
2,2-bis[4-[2-methacryloxyethoxy]phenyl]propane	BIS-EMA	1	—
2,2-bis[4-(methacryloxy)phenyl]propane	BIS-MA	2	—
2,2-bis[4-(2-hydroxy-3-methacryloxypropoxy)phenyl]propane	BIS-GMA	2	—
1,4-butanediol diacrylate	BUDA	0.1	—
1,6-hexanediol diacrylate	HDDA	0.1	—
diethyleneglycol diacrylate	DEGDA	0.1	—
tripropyleneglycol diacrylate	TPGDA	0.1	—
trimethylolpropane triacrylate	TMPTA	0.1	—
pentaerythritol triacrylate	PETA	0.1	—
oligotriacrylate 480	OTA 480	0.1	—
epoxy diacrylate (2,2-bis[4-(2-hydroxy-3-acryloxypropoxy)phenyl]propane	BIS-GA	0.5	—
urethane diacrylate (aliphatic)	al-UDA	0.1	—
urethane diacrylate (aromatic)	ar-UDA	0.05	—
triethyleneglycol diacrylate	TREGDA	0.1	—
N,N-methylenebisacrylamide	MBAA	1	—
tetrahydrofurfuryl methacrylate	THFMA	2	—
ethyl cyanoacrylate	ECA	2	—
Vitremer® glass ionomer primer		1	++
Vitremer® glass ionomer liquid		1	++
Vitremer® glass ionomer powder		1	—

Discussion

Methyl methacrylate (MMA) has caused allergic contact dermatitis since the 1940s (1, 2). The acrylics in the dental composite resins and bonding agents turned out to be stronger sensitizers than MMA in the 1980s and 1990s (3–8). Triple-cured hybrid-glass ionomers were introduced in the 1990s (Table 1, Fig. 1), but have not previously been reported as causing allergic contact dermatitis. It is emphasized that glass ionomers contain the same sensitizing acrylics, e.g., 2-HEMA (Table 1, Fig. 1), as dental composite resins and bonding agents. As hybrid-glass ionomers are mixed manually, and acrylics rapidly penetrate protective gloves (9), the risk of becoming occupationally sensitized is evident. Thus, no-touch techniques should be used when handling uncured acrylics.

References

1. Kanerva L, Estlander T, Jolanki R. Occupational skin allergy in the dental profession. *Derm Clinics* 1994; 12: 517–532.
2. Stevenson W J. Methyl-methacrylate dermatitis. *Contact Point* 1941; 18: 171.
3. Niinimäki A, Rosberg J, Saari S. Allergic stomatitis from acrylic compounds. Report of a case. *Contact Dermatitis* 1983; 9: 148.
4. Kanerva L, Jolanki R, Estlander T. Occupational dermatitis due to an epoxy acrylate. *Contact Dermatitis* 1986; 14: 80–84.
5. Kanerva L, Estlander T, Jolanki R. Allergic contact dermatitis from dental composite resins due to aromatic epoxy acrylates and aliphatic acrylates. *Contact Dermatitis* 1989; 20: 201–211.
6. Kanerva L, Turjanmaa K, Estlander T, Jolanki R. Occupational allergic contact dermatitis from 2-hydroxyethyl methacrylate (2-HEMA) in a new dentin adhesive. *Am J Contact Dermatitis* 1991; 2: 24–30.
7. Kanerva L, Turjanmaa K, Jolanki R, Estlander T. Occupational allergic contact dermatitis from iatrogenic sensitization by a new acrylate dentin adhesive. *Eur J Dermatol* 1991; 1: 25–28.
8. Alanko K, Kanerva L, Jolanki R, Kannas L, Estlander T. Oral mucosal diseases investigated by patch testing with a dental screening series. *Contact Dermatitis* 1996; 34: 263–267.
9. Munksgaard E C. Permeability of protective gloves to (di)-methacrylates in resinous dental materials. *Scand J Dent Res* 1992; 100: 189–192.

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