

Review Article

Eyeglass allergic contact dermatitis

TOKIO NAKADA^{1,2} AND HOWARD I. MAIBACH¹

¹Department of Dermatology, University of California, School of Medicine, Box 0989, Surge 110, San Francisco, California 94143-0989, USA

²Department of Dermatology, Showa University, School of Medicine, 1-5-8, Hatanodai, Shinagawa-ku, Tokyo 142-8666, Japan

A literature review is presented of allergic contact dermatitis from eyeglasses. Causes are grouped into metals, plastics, plasticizers, solvents, UV stabilizers, antioxidants, dyes, and waxes. Plasticizers and UV stabilizers are currently the most common allergens.

Key words: allergic contact dermatitis; eyeglass frames; patch testing technique; scrapings; plasticizers; UV stabilizers; nickel; seborrheic dermatitis. © Munksgaard, 1998.

Accepted for publication 10 February 1998

It has generally been difficult to define the chemicals causing eyeglass (spectacle frame) allergic contact dermatitis, because of the often long chain be-

tween the retail shop and the manufacturer, and industry's reticence to share the chemistry involved. In an attempt to focus investigations on

Table 1. Reported cases of contact dermatitis from eyeglass frames (-1985)

No.	Author	Year	Allergen or cause
1-5	Kristjansen	1937	acetone extract 2, unknown 3
6	Berkhof	1938	triphenyl phosphate, tricresol phosphate, cellulose acetate
7	Bonnevie	1939	para-aminophenol, para-phenylenediamine
8	Gray	1943	brown-black dye
9	Gaul	1958	unknown (irritant reaction+red and white gold?)
10	Wilde	1959	phenol-formaldehyde, rubber
11	Pritsche	1961	para-aminophenol, nickel
12	Pegum (1)	1966	tritoyl phosphate, triphenyl phosphate
13-28	Smith (2)	1966	nickel 2, plastics 4, methylethylketone 1, waxes 1, para-phenylenediamine 1, triphenyl phosphate or cobalt 1, irritant 3, unknown 3
29	Torsuev (3)	1969	plastics
30	Jordan (4)	1971	ethylene glycol monomethyl ether acetate
31-35	Jordan (5)	1972	resorcinol monobenzoate 3, solvent yellow 3: 1, solvent yellow 3, red 26, or p-tert-butyl-phenol: 1
36	Jordan	1972	turpentine
37	Calnan	1975	resorcinol monobenzoate
38	Fisher (6)	1976	optyl: a plastic material of epoxy type
39	Jirasek (7)	1976	nickel
40	Hambly (8)	1978	butyl acrylate
41	Grimalt (9)	1978	nickel
42	D-Goossens (10)	1979	nickel
43-45	Cronin	1980	red 481
46-53	Kalensky (11)	1980	nickel 4, cobalt 1, cellulose acetate 1, nickel or cellulose acetate 1, unknown 1
54	D-Goossens (12)	1981	anthraquinone
55	Maneghini	1982	nickel
56-58	Rycroft	1983	phenyl salicylate, resorcinol benzoate
59-60	Popadinets (13)	1984	plastics
61-67	Hausen (14)	1985	unknown

Table 2. Reported cases of contact dermatitis from eyeglass frames (1986–1996)

No.	Author	Year	Patients	Region	History	Patch test with scrapings	Allergen
68	Sonnex (15) (England)	1986	42/F	retroauricular, upper right cheek	5 months	++	phenyl salicylate
69			54/M	behind ears	18 months	++	phenyl salicylate
70			64/M	both ears, both sides of bridge of nose	10 months	++	phenyl salicylate?
71	Carlsen (16) (Denmark)	1986	67/F	bridge of nose, temples	?	++	triphenyl phosphate
72	Vilaplana (17) (Spain)	1987	47/F	side of nose	1 month	NT	aliphatic isocyanate
73–114	Sun (18) (Taiwan)	1987	42 cases M: 17, F: 25	face	–	NT	nickel
115	Doherty (19) (Australia)	1988	64/F	side of the nasal bridge, medial aspect of eyebrows, lower lids, retroauricular	2 years	++	para-phenylenediamine
116	Oliwiecki (20) (England)	1991	71/F	temples, retroauricular	several years	+	diethyl phthalate
117–126	Bian (21) (China)	1991	10 cases	face	–	NT	nickel
127	Thörneby-Andersson (22) (Sweden)	1994	60/F	retroauricular, nose and cheeks	3 weeks	spectacle frame series (-)	abietic acid

the etiology of eyeglass allergic contact dermatitis, we retrieved the literature from Medline (1966–1997) and the Hausen & Jung review (14). Cases reported up to 1985 are listed in Table 1, and subsequent cases in Table 2.

Eczematous lesions were present where frames were in contact with the skin (Table 2), except in 1 case: contact acne due to nickel (9). Diagnosis was

often delayed in cases with retroauricular lesions, because of difficulty in distinguishing them from seborrheic dermatitis (Table 2). Although patch testing with softened (with an organic solvent) scrapings from frames is useful in diagnosis, several portions of frames should be sampled since all parts may not be composed of the same material.

Causes of allergic contact dermatitis were metals, plastics, plasticizers, solvents, UV stabilizers, antioxidants, dyes, and waxes (Table 3). Plasticizers and UV stabilizers are the most common allergens in recent years (15–17, 23), except in Taiwan (18) and China (21), where nickel is an important cause (Table 2).

Although contact dermatitis from eyeglass frames is uncommon, it should be suspected in patients with retroauricular dermatitis; patch testing with softened scrapings from frames is a valuable diagnostic aid. The materials in Table 3 may be an appropriate eyeglass screening series, until more current chemical information becomes available.

Acknowledgements

We gratefully acknowledge the assistance of Doris Schwindt and Gergana Gallacher.

References

1. Pegum J S. Contact dermatitis from plastics containing triaryl phosphates. *Br J Dermatol* 1966; 78: 626–631.
2. Smith E L, Calnan C D. Studies in contact dermatitis. XVII. Spectacle frames. *Transactions of the St Johns Hospital Dermatological Society* 1966; 52: 10–34.

Table 3. Allergens in contact dermatitis from eyeglass frames

metals	cobalt nickel
plastics	butyl acrylate cellulose acetate epoxy resin phenol-formaldehyde, rubber
plasticizers	abietic acid diethyl phthalate tricresyl phosphate triphenyl phosphate tritolyl phosphate
solvents	ethylene glycol monomethyl ether acetate methyl ethyl ketone
UV stabilizers	resorcinol monobenzoate phenyl salicylate
antioxidant	p-tert-butyl-phenol
dyes	anthraquinone brown-black dye paraphenylenediamine paraaminophenol solvent yellow 3, red 26, red 481
waxes	aliphatic isocyanate turpentine

3. Torsuev N, Bukharovich M N, Shvindel'man A V. Dermatitis from plastic spectacle frames. *Vestnik Dermatologii i Venerologii* 1969; 45: 61 (in Russian).
4. Jordan W P Jr, Dahl M V. Contact dermatitis to a plastic solvent in eyeglasses. Cross-sensitivity to ethyl acetate. *Arch Derm* 1971; 104: 524–528.
5. Jordan W P Jr, Dahl M V. Contact dermatitis from cellulose ester plastics. *Arch Derm* 1972; 105: 880–885.
6. Fisher A A. Epoxy resin dermatitis. *Cutis* 1976; 17: 1027–1028, 1041.
7. Jirasek L, Kobikova M, Jiraskova N. Retroauricular eczema caused by the nickel of celluloid-rimmed spectacles. *Cs Derm* 1976; 51: 369–371 (in Czech).
8. Hambly E M, Wilkinson D S. Contact dermatitis to butyl acrylate in spectacle frames. *Contact Dermatitis* 1978; 4: 115.
9. Grimalt F, Romaguera C. Nickel allergy and spectacle frame contact acne. *Contact Dermatitis* 1978; 4: 377.
10. Dooms-Goossens A, Degreef H, Luytens E. Dihydroabietyl alcohol (Abitol®). A sensitizer in mascara. *Contact Dermatitis* 1979; 5: 350–353.
11. Kalensky J, Jiraskova M. Contact allergic eczema caused by glass frames, and its differential diagnosis. *Cs Derm* 1980; 55: 309–313 (in Czech).
12. Dooms-Goossens A, Bonamie A, Parys M, Dooms M. Sensitizing anthraquinone dye in spectacle frames. *Contact Dermatitis* 1981; 7: 214–215.
13. Popadinets V A. Dermatitis due to plastic eyeglass rims. *Vestnik Dermatologii i Venerologii* 1984; 60: 73–74 (in Russian).
14. Hausen B M, Jung H D. Brillengestell-Dermatitis. *Akt Dermatol* 1985; 11: 119–123 (in German).
15. Sonnex T S, Rycroft R J G. Dermatitis from phenyl salicylate in safety spectacle frames. *Contact Dermatitis* 1986; 14: 268–270.
16. Carlsen L, Anderson K E, Egsgaard H. Triphenyl phosphate allergy from spectacle frames. *Contact Dermatitis* 1986; 15: 274–277.
17. Vilaplana J, Romaguera C, Grimalt F. Allergic contact dermatitis from aliphatic isocyanate on spectacle frames. *Contact Dermatitis* 1987; 16: 113.
18. Sun C-C. Allergic contact dermatitis of the face from contact with nickel and ammoniated mercury in spectacle frames and skin-lightening creams. *Contact Dermatitis* 1987; 17: 306–309.
19. Doherty E, Freeman S. Spectacle frame dermatitis due to paraphenylenediamine. *Australas J Dermatol* 1988; 29: 113–115.
20. Oliwiecki S, Beck M H, Chalmers R J G. Contact dermatitis from spectacle frames and hearing aid containing diethyl phthalate. *Contact Dermatitis* 1991; 25: 264–265.
21. Bian Z, Weixin F. Facial contact dermatitis. Pathogenic factors in China. *Int. J Dermatol* 1991; 30: 485–486.
22. Thörneby-Andersson K, Hansson C. Allergic contact dermatitis from colophony in waxes for polishing spectacle frames. *Contact Dermatitis* 1994; 31: 126–127.

Address:

T. Nakada
Department of Dermatology
University of California
School of Medicine
Box 0989, Surge 110
San Francisco, CA 94143-0989
USA