

The Role of Patch Testing in Oral Disease

To the Editor:

The role of contact allergens in the causation of oral mucosal pathology remains controversial, and the literature contains conflicting reports about the value of patch testing in these cases. In this study, a retrospective case note review was carried out on sequential patients referred from a large university dental school between 1998 and 2008. Oral lichen planus or lichenoid reaction (OLP), orofacial granulomatosis (OFG), recurrent oral ulceration and burning mouth syndrome (BMS) were the most frequent conditions studied. All patients were tested with the European Standard series (Chemotechnique Diagnostics, Malmö, Sweden) or subsequently with the British Contact Dermatitis Society standard series, in addition to a dental series (Chemotechnique Diagnostics) and a perfumes and flavorings series (Trolab, Omniderm Pharma Canada Inc., Vaudreuil-Dorion, Quebec, Canada) (Table 1). Patch tests were placed on the upper back under Finn Chambers (Epitest Ltd Oy, Tuusula, Finland) on Scanpor tape (Norgesplaster A/S, Vennesla, Norway), and reactions were read by a consultant dermatologist according to United Kingdom national guidelines at day 2 and day 4¹ and using International Contact Dermatitis Research Group criteria. Irritant reactions were excluded, and no patients were immunosuppressed. Results for sensitivity to allergens in the standard series for the dental patients were compared to 200 controls patch-tested in the same manner for suspected contact dermatitis. When sensitivity rates for allergens in the dental series and the perfumes and flavorings series were compared, the group of patients with oral ulceration were used as a control group, against which the other groups of dental patients were assessed. This group was chosen because previous literature did not suggest a definite role for contact hypersensitivity in oral ulceration pathogenesis. All statistical analyses were

performed with the Fisher exact test with SPSS version 17 (SPSS Inc., Chicago, IL).

The study included 658 patients, 65% female, with an average age of 52 years. The numbers within each diagnostic category were as follows: OLP, 334 (25% with histologic confirmation); OFG, 93 (16% with histologic confirmation); recurrent oral ulceration, 145; and BMS, 47. Of the control group patch-tested for suspected contact dermatitis, 67% were female with an average age of 44 years.

The most striking results in this study were the high levels of mercury sensitivity (32% sensitive, $p < .001$) and gold sensitivity (13% sensitive, $p < .05$) in the OLP group (Table 2), compared to dental patients in the other diagnostic categories. In those with OLP and mercury sensitivity, 84% were recorded as having a current dental amalgam; in 89% of these, the amalgam was adjacent to the OLP. There was a high level of gold sensitivity (11%) in the BMS group, although this did not reach statistical significance. There was no increase in sensitivity rates above control level for fragrance, flavorings, or acrylates or for any of the standard series in any of the oral disease categories.

This study thus supports previous work suggesting that mercury sensitivity can play a significant role in OLP.²⁻⁴ The rate of positivity may also be increased when the OLP is adjacent to an amalgam restoration.² Dental amalgams do continue to be mercury based and are still widely used throughout Europe and the United States, making this a very relevant and current problem. Gold sensitivity is less frequently discussed, although several previous studies found high positive-reaction rates in patients with OLP.^{4,5} This current study found a sensitivity rate of 13%, although the mechanism and relevance of this seems uncertain as not all of these patients had gold dental restorations and a minority had a clinical history of sensitivity to gold or jewelry.

This large study therefore supports the hypothesis that mercury restorations can cause OLP and also suggests gold as a possible etiologic factor. The findings did not support any significant role for contact sensitivity in patients with BMS, OFG, or recurrent oral ulceration, and the role of patch testing in these patients appears questionable.

For many of the patients in this large retrospective study, no follow-up was carried out to find out if allergen avoidance improved symptoms and signs; thus, the major limitation of this study concerns its ability to verify the

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Table 1. Components of the Dental Series and Perfumes and Flavorings Series

<i>Dental Series*</i>		<i>Perfumes and Flavorings[†]</i>	
Methyl methacrylate 2%	Aluminum chloride hexahydrate 2%	Benzyl salicylate 1%	Fragrance mix II constituents
Triethylene glycol dimethacrylate 2%	Camphoroquinone 1%	Benzyl cinnamate 5%	Citral 2%
Urethane dimethacrylate 2%	N,N-Dimethylaminoethyl methacrylate 0.2%	Salicylaldehyde 2%	Citronellol 1%
Ethylene glycol dimethacrylate 2%	Hexandiol diacrylate 0.1%	Vanillin 10%	Farnesol 5%
Bis-GMA 2%	Tinuvin P 1%	Benzyl alcohol 1%	Coumarin 5%
N,N-Dimethyl-4-toluidine 5%	Tetrahydrofurfuryl methacrylate 2%	Benzaldehyde 5%	α -Hexylcinnamaldehyde 10%
2-Hydroxy-4-methoxybenzophenone 10%	Tin 50%	Menthol 1%	Essential oils and extracts
Butane dioldimethacrylate 2%	(Ammoniated mercury 1%) [‡]	Dipentene (D-limonene) 2%	Tree moss 1%
2,2-bis(4-Methacryloxy)phenyl propane 2%	(Mercuric chloride 0.1%) [‡]	Gamma methyl ionone 1%	Clove oil 2%
Potassium dichromate 0.5%		Anisyl alcohol 1%	Orange oil 2%
Mercury 0.5%		α -Amylcinnamyl alcohol 1%	Cedarwood oil 10%
Cobalt chloride hexahydrate 1%		Benzyl benzoate 1%	Eucalyptus oil 2%
Hydroxyethyl methacrylate 2%		Lilial 10%	Laurel leaf oil 2%
Gold sodium thiosulfate 2%		Linalool (stabilized) 10%	Lemongrass oil 2%
Nickel sulfate hexahydrate 5%		Methyl heptin carbonate 1%	Lemon oil 2%
Eugenol 2%		Majantol 5%	Neroli oil 2%
Colophony 20%		Fragrance mix I constituents	Peppermint oil 2%
Ethyl-4-toluenesulfonamide 0.1%		Cinnamyl alcohol 1%	Ylang ylang oil 10%
Formaldehyde 1%		Cinnamaldehyde 1%	Narcissus absolute 2%
4-Tolyldiethanolamine 2%		Eugenol 1%	Jasmine absolute 5%
Copper sulfate 2%		α -Amylcinnamaldehyde 1%	Sandalwood oil 10%
Methylhydroquinone 1%		Hydroxycitronellal 1%	Patchouli oil 10%
Palladium chloride 2%		Geraniol 1%	
		Isoeugenol 1%	
		Oak moss absolute 1%	
		Sorbitan sesquioleate 20%	

Bis-GMA = bisphenol A glycidyl methacrylate.

*Chemotechnique Diagnostics, Malmö, Sweden.

[†]Trolab, Omniderm Pharma Canada Inc., Vaudreuil-Dorion, Quebec, Canada.

[‡]Also included in testing.

relevance of sensitivities. The study is currently ongoing to assess outcomes after amalgam removal in the OLP group with mercury sensitivity.

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Table 2. Sensitivity Results of Acrylates and the Top Five Allergens Tested

<i>Allergen</i>	<i>OLP (N = 334) (%)</i>	<i>OFG (N = 93) (%)</i>	<i>BMS (N = 47) (%)</i>	<i>Ulceration (N = 145) (%)</i>
Nickel sulfate	19	11	23	20
Mercury 0.5%	32*	3	2	6
Gold sodium thiosulfate	13*	5	11	5.5
Fragrance mix I	6	6	9	4
<i>Myroxilon pereirae</i>	7	5	9	2
Acrylates	0.5	0	0	0

BMS = burning mouth syndrome; OFG = orofacial granulomatosis; OLP = oral lichen planus or lichenoid reaction.

*Statistically significant when compared to control group ($p < .05$).

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