

Short Communication

Indium and iridium allergy in patients exposed to dental alloys

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Subjective systemic symptoms have been linked to various metals in dental restoration materials (1, 2). Indium and iridium are in 2 currently used dental amalgams (Table 1), as well as in white gold (Table 2) onto which porcelain is fused for dental crowns and/or bridges.

Patients and Methods

All patients in this study were referred to the Dermatology Clinic at Huddinge Hospital for suspected hypersensitivity to dental materials. Most had no oral mucosal reactions, but had systemic symptoms as previously described (1). During 1990–1995, indium and iridium salts were sporadically patch tested, but during 1995–1996, patients were consecutively patch tested (Table 3).

During 1990–1995, 5 patients were positive to indium and iridium (Table 3). During 1995–1996, 205 patients were tested and 8 were positive. Patch tests with Finn Chambers (3) and reagents, prepared and obtained from Chemotechnique Diagnostics (Malmö, Sweden), were applied to the back for 2 days and read after 4 days (1,

4). Patients were asked to report late reactions. Reactions were graded: + weak non-vesicular reaction; ++ strong oedematous vesicular reaction; +++ extreme reaction (4). Only ++ and +++ reactions were accepted as positive, plus a + reaction to 2 or more concentrations (Table 3).

Positive patch test reactions to indium and iridium were detected in 3.9% and 1% of the patients tested, respectively. 9 patients were positive to indium sulfate and 7 to indium chloride. 1 patient was positive to all 3 test concentrations of iridium chloride, 2 to 2 test concentrations, and 1 to 1 test concentration. No reactions were obtained to ammonium hexachloroiridate. The remaining 197 subjects were negative to all indium and iridium salts. Concomitant allergies to cobalt, nickel, gold and palladium were detected in 6 patients (Table 3).

Discussion

Cutaneous symptoms have been described from systemic exposure to nickel, cobalt, chromium, gold and platinum

Table 1. 2 indium-containing alloys used to amalgamate with mercury to form dental amalgam

Trade name	Manufacturer/ address	Contents (%)				
		Ag	Sn	Cu	Zn	In
Indiloy ^(T)	Shofu Dental Corporation, USA	60	22	13	0	5
Permite C ^(T)	Southern Dental Industries, Australia	56	27.9	15.4	0.2	0.5

Source: NIOM (Scandinavian Institute of Dental Materials) Haslum, Norway.

Table 2. % content of metal components in white gold frequently used in Swedish dental practice

Alloy	Au	Pt	Ir	Pd	Ag	Cu	Zn	Fe	In	Sn	Co	Re
M TM	87.8	4.3	0.1	5.8	0.8			0.4	0.4	0.4		
M-2 TM	84.0	7.9	0.1	5.0	0.9	0.3	0.1	0.2	1.0	0.5		
M-3 TM	78.5	9.8	0.2	8.0					3.5			
M75 TM	75.0			17.9	1.3				4.5	1.0	0.2	0.1

Manufacturer: JS Sjödings, Kista, Sweden.

Table 3. Results of patch testing with indium and iridium salts

Sex/ age (years)	Remarks	IrCl ₃ (0.1%)	IrCl ₃ (0.32%)	IrCl ₃ (1%)	AIr (0.01%)	AIr (0.032%)	AIr (1%)	InS (1%)	InS (3.16%)	InS (10%)	InCl ₃ (1%)	InCl ₃ (3.11%)	InC ₃ (10%)	Concomi- tant metal allergies
f/71	10D LR	—	—	—	—	—	—	+	++	++	—	—	+++	—
f/45	—	—	—	—	—	—	—	++	++	+++	+	++	++	Co,Ni, Pd
f/42		—	++	++	—	—	+	—	—	—	—	—	—	—
m/43		—	—	++	—	—	—	—	—	++	—	—	—	—
f/48		++	++	+++	—	—	—	—	—	—	—	—	—	Ni,Pd
f/50		NT	+++	+++	NT	—	—	NT	++	+++	NT	—	—	Au
f/53		NT	—	—	NT	—	—	NT	+	++	NT	+++	+++	Au,Cr
f/42		NT	—	—	NT	—	—	NT	—	++	NT	—	—	—
m/37		NT	+	+	NT	—	—	NT	++	++	NT	+	++	—
m/55		NT	—	+	NT	—	—	NT	++	++	NT	—	—	—
m/47		NT	—	—	NT	—	—	NT	—	+	NT	+	+	—
f/49	3W LR	NT	—	—	NT	—	—	NT	—	+++	NT	++	++	Ni,Pd
m/49		NT	—	—	NT	—	—	NT	—	—	NT	—	++	—

IrCl₃-iridium chloride; AIr-ammonium hexachloroiridate; InS-indium sulfate; InCl₃-indium chloride; all in water; the first 5 patients were found by sporadic testing (3 concentrations); the remaining 8 were found by consecutive testing (2 concentrations). W-week. LR-late reaction.

(5–13), and psychosomatic symptoms, unrelated to contact allergy, from mercury (14). Indium isotopes are used medically (15, 16) and biologically (17), and anaphylactic reactions have been described (16). Indium¹¹¹ isotope has been used to detect metastatic melanoma (18). Cutaneous allergic vasculitis following injection of indium^{113m} has been reported (19). Subjective symptoms on occupational exposure to iridium chloride have been described (20).

A method to establish the qualitative composition of the dental alloys used has been developed (8), which will facilitate further studies of possible side-effects of dental alloys. Meanwhile, iridium chloride and indium sulfate and/or chloride should be added to dental screening series.

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