

TSUSHIMA FUMIHIKO (Orcid ID: 0000-0002-1919-746X)

A case report of oral lichenoid lesions related to cross-reactivity between nickel and palladium

Fumihiko [Tsushima](#)¹, Jinkyo [Sakurai](#)¹, Risa [Shimizu](#)¹, Hiroyuki [Harada](#)¹

¹ Department of Oral and Maxillofacial Surgery, Division of Oral Health Sciences, Graduate School, Tokyo Medical and Dental University

Corresponding author: Fumihiko [Tsushima](#)

Department of Oral and Maxillofacial Surgery, Division of Oral Health Sciences, Graduate School, Tokyo Medical and Dental University, 1-5-45 Yushima, Bunkyo-ku, Tokyo 113-8510, Japan

TEL: +81-3-5803-5506

Email: ft.osur@tmd.ac.jp

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Case report

A 50-year-old woman was referred to our department for the diagnosis and management of white papular lesions on the buccal mucosa. The patient has been aware of the roughness of the buccal mucosa for 3 months. As a medical history, the patient had been aware of skin irritation with piercings, necklaces, and bracelets from around the age of 25 but had never been examined by a dermatologist. Moreover, the patient had Hashimoto's thyroiditis without relevant family history. Intraoral examination showed white papular lesions close to or in contact with gold–silver–palladium alloy prostheses located on the bilateral buccal mucosa (Fig. 1). No lichenoid lesion was found on the skin.

A biopsy was performed on the right buccal mucosa, and the specimen was compatible with the diagnosis of oral lichen planus. We suspected oral lichenoid lesions (OLLs) related to metal allergy and consulted the dermatologist at our hospital for a skin patch test. The skin patch test was performed based on the International Contact Dermatitis Research Group criteria (negative reaction: -, positive reaction: +, ++, +++, doubtful reaction: ?+, irritant reactions: IR). A selection of allergens commonly used in dentistry including metal allergens (Table S1) purchased from Torii Pharmaceutical Co., Ltd. (Tokyo, Japan) were applied in a Patch Tester (Torii Pharmaceutical Co., Ltd, Tokyo, Japan), pasted on the back of the patient, and then removed after 48 h. Assessment was performed on days 2, 3, and 7. The patient showed positive reaction (++) to nickel (Ni) sulfate 5% aq, doubtful reaction (?+) to palladium (Pd) chloride 1% aq, and irritant reactions (IR) to cobalt (Co) chloride 2% aq and potassium dichromate (Cr) 0.5% aq on day 7. All other allergens were negative.

The gold–silver–palladium alloy prostheses in the oral cavity did not contain Ni, but Pd. We diagnosed OLLs caused by allergic contact stomatitis to Pd based on cross-reactivity to Ni. The patient agreed to remove the metal prostheses, which was replaced with resin or ceramic by the patient's dental practitioner. The lesions had completely healed 3 months after the metal prostheses was removed without any other treatment (Fig. 2).

Discussion

Patch testing is the primary diagnostic tool for allergic contact stomatitis and useful for clinicians to determine which dental metal prostheses to remove. However, a negative patch test does not rule out hypersensitivity to an allergen; it is possible that the exposure of presensitized subjects to other metals can lead to cross-reactivity between metals (1). Pd induces contact dermatitis in patients with Ni allergy due to cross-reactivity at the T cell clonal level (2). Ni hypersensitivity is one of the most common metal allergies, and herein, the patient showed a positive reaction to Ni reagents. In Japan, ear/body piercings have been postulated, especially among females, as

the main cause of nickel allergy since the 1990s (3). In dentistry, Pd is typically used in metal restorations and to produce metal prostheses; however, it is unstable in the oral cavity as it releases metal content into the saliva, which could cause a serious allergic reaction (3). Therefore, we should be aware of the metal components contained in oral–dental metal prostheses for patients with OLLs with Ni allergies.

References

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Figure Legends

Fig. 1 Oral lichenoid lesions (OLLs) related to Au–Ag–Pd alloy prostheses in the right and the left buccal mucosa with papular lesions.

Fig. 2 All gold–silver–palladium alloy prostheses were replaced with composite resin restorations or ceramic prostheses, and complete healing of the OLLs on the right and the left buccal mucosa was achieved.





Supplemental Table 1: Patch test reagents

No	Allergen	% Vehicle	No	Allergen	% Vehicle
1	Ammonium tetrachloroplatinate	0.25% pet	20	Titanium (Ti) oxide	10% pet
2	Amalgam alloy metals	20% pet	21	Aluminium (Al) chloride	2% aq
3	Amalgam non gamma2	5% pet	22	Tetrachloroauric acid (Au)	0.2% aq
4	Bisphenol A	1% pet	23	Stannic (Sn) chloride	1% aq
5	Bisphenol-A-dimethacrylate	2% pet	24	Ferric (Fe) chloride	2% aq
6	BIS-GMA	2% pet	25	Chloroplatinic (Pt) acid	0.5% aq
7	2-Hydroxy ethylacrylate	0.1% pet	26	Palladium (Pd) chloride	1% aq
8	di-Urethane-dimethacrylate	2% pet	27	Indium (In) trichloride	1% aq
9	Ethylenglycol-dimethacrylate	2% pet	28	Iridium (Ir) tetrachloride	1% aq
10	2-Hydroxyethylmethacrylate	1% pet	29	Zinc (Zn) chloride	2% pet
11	Methyl-methacrylate	2% pet	30	Manganese (Mn) chloride	2% pet
12	Tetracain-HCl	1% pet	31	Silver (Ag) bromide	2% pet
13	Triethyleneglycol-dimethacrylate	2% pet	32	Cobalt (Co) chloride	2% aq
14	Benzoyl peroxide	1% pet	33	Mercuric (Hg) chloride	0.05% aq
15	1,3-Butandiol dimethacrylate	2% pet	34	Potassium dichromate (Cr)	0.5% aq
16	N, N-Dimethyl-p-toluidine	2% pet	35	Chromium (Cr) sulfate	2% aq
17	Hydroxypropyl 2-methacrylate	2% pet	36	Copper (Cu) sulfate	1% aq
18	Gold sodium thiosulfate	0.25% pet	37	Nickel (Ni) sulfate	5% aq
19	Titanium (Ti) oxide	30% pet			