



## Case report

# Oral lichenoid contact lesion to amalgam restoration: a case report

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## Abstract

Amalgam has been used for nearly 150 years in dentistry and it is still being used because of advantages such as low cost, ease of handling, physical characteristics like diversity in applications and low frequency of local and systemic biological side effects. On the other hand the disadvantages of dental amalgam comprise poor aesthetics, local degradation, occasional allergic responses to some of its components or degradation products, and the toxicity of mercury. Amalgam and/or its components may cause a type IV hypersensitivity reactions on the oral mucosa. Most patients with oral lichen planus (OLP) have no evidence of any association with dental restorative materials. However, contact or proximity to restorations involving amalgam or other materials causes some lichenoid reactions that is to say, lesions that clinically and histologically resemble lichen planus (LP), but have an identifiable etiology. These reactions are presumably due to allergic or toxic reactions to compounds released or generated. The present case report presents a patient with a unilateral oral lichenoid reactions (OLRs) to an amalgam restoration in the right mandibular molar region.

**Keywords:** Oral lichenoid reactions, oral lichen planus, amalgam restoration, oral mucosa

## Introduction

Many dental materials and medicaments contain substances that can cause hypersensitivity reactions of the oral mucosa or the skin [1-3]. Generally, the allergenic substances in the dental environment are local anesthetic agents [4], antibiotics [5], restorative materials [6] and latex [7]. The symptoms are normally classified as delayed hypersensitivity reactions (type IV), and they were called oral lichenoid reactions (OLRs) by Finne et al [8]. OLRs affect oral mucosa in direct contact with amalgam restorations, and they represent a delayed, type IV, cell-mediated immune response to mercury or many metals, such as gold, palladium, nickel, chrome, and cobalt, may induce OLRs [8,9], and but the material most frequently associated with OLRs is dental amalgam, and the lesions are the consequence of a hypersensitivity to one of its components, often mercury, but sometimes copper, zinc, or tin [8-12].

The clinical occurrence of OLRs is similar to oral lichen planus. OLRs are often seen in direct topographic relation to the offending agent and are generally unilateral, and they can be reticular, in the form of plaques, atrophic and erosive or a combination of the foregoing. However, classical OLP presents as bilateral and symmetrical, white, papular/reticular or red atrophic/ulcerative lesions affecting all areas of the oral mucosa [12-14]. The possible etiologic factors of OLP include genetic background, infectious agents, autoimmune reactions, immunodeficiency, chronic liver disease, drugs, chemicals, stress, trauma, food allergies, diabetes, hypertension, malignant neoplasms, electrogalvanism and dental materials [15,16]. Some authors believe that a contact allergy to amalgam

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or other factors mentioned above causes OLP [16,17], whereas others have claimed the existence of two different diseases: OLRs related to amalgam; and OLP as an idiopathic disorder [18-21].

Despite the development of various new dental restorative materials, dental amalgams remain the most commonly used posterior restorative materials in practice. However, the literature includes very few reported cases of OLRs, and almost all of the reported OLRs cases have involved hypersensitivity reactions to mercury. The present case report presents a patient with a unilateral OLR to a buccal amalgam restoration in the right mandibular molar region.

### Case report

A 46-year-old woman was referred to our clinic with a complaint of soreness affecting the right buccal mucosa, which was worsened by consuming spicy foods and acidic drinks. She had received an amalgam restoration 2 years earlier, and she first noticed symptoms 6 months before presentation, with the symptoms becoming progressively worse with time. Her medical history was noncontributory; she was taking no medications and had no known allergies. Intraoral examination disclosed the presence of a reticular, atrophic, lightly erythematous lesion affecting the buccal mucosa of right mandibular first molar side. The lesion was in direct contact with the amalgam restoration (Figures 1 and 2). The associated right mandibular first molar responded within normal limits to electric pulp testing. The remainder of the oral mucosa was normal.

Given the close association of the lesions with the amalgam



Figure 1. Intra-oral view of the lesion.



Figure 2. Buccal lichenoid reaction to an amalgam restoration.

restorations, a provisional diagnosis of a lichenoid reaction to amalgam was made and the patient was patch tested using the European Standard and Dental Materials Series (Trolab Bioidagnostics Ltd, Worcestershire, UK) patch test allergens. A strongly positive response to mercury (Trolab allergen E0602, 1% ammoniated mercury in petrolatum) and a slightly weaker response to amalgam (Trolab allergen E2509, 5% amalgam in petrolatum) were obtained after 72 hours. The patient received local anesthesia of 2% lidocaine with 1:100,000 epinephrine. The amalgam restoration was removed under a rubber dam with copious irrigation and a high aspiration volume. The cavity was restored with light-cured posterior composite resin (Filtek p60, 3M ESPE, Seefeld, Germany). The patient was reviewed after 1 month, and the lesion was resolved (Figure 3). At the 12-month follow-up, no lesion was seen, and the patient had no discomfort (Figure 4).

### Discussion

Despite the common use of amalgam as a posterior restorative material, there have been a few reported cases of hypersensitivity to amalgam, and the most common type reported is delayed oral lichenoid reaction [10,22]. OLRs caused by amalgam restorations can be found in the literature, with symptoms such as eczema, urticaria, wheals on the face and limbs, rashes and sometimes pink or Kawasaki disease [2,12,23]. In several cases, systemic reactions have been noted [24]. OLRs are not usually seen, likely because of amalgam's insolubility and the saliva's washing function [25,26].



**Figure 3.** After removal of the offending amalgam restoration. With a filling made of composite restorations (one-month follow-up).



**Figure 4.** The lesion has completely disappeared (one year follow-up).

When haptens contact the oral mucosa, the reaction starts. A hapten is an incomplete antigen that binds to proteins/counterparts to produce complete antigens [27]. Sensitization usually occurs through contact of hapten with the oral mucosa. Rarely, sensitization may also occur by contact of hapten with skin. Memory T cells are activated soon after the initial exposure. On re-exposure to the same allergen, a type IV hypersensitivity reaction occurs [23,24]. This reaction may be delayed by at least 48 hours and the clinical presentation may vary depending on the severity of the reaction. These reactions can be either acute or chronic [24,30,31]. Clinical presentations vary based on the nature of reaction, type of allergen site and duration of contact.

Patients with acute lesions may present with burning or redness [8,16,24]. Vesicles are rarely seen and if present rupture in a short while after formation. Chronic lesions typically present as areas of erythema, edema, desquamation and occasionally ulceration. In addition, allergic contact stomatitis can also present as erosions with rough surface and irregular borders, often surrounded by a red halo [8,16,24,30,31]. In this case, the corrosion products of amalgam, including mercury, tin, copper and zinc, might have acted as haptens and started the inflammatory process, leading to a delayed oral lichenoid reaction.

The lesions of OLRs are similar to OLP. However, OLRs can be differentiated from OLP lesions. OLR lesions are usually in close proximity to amalgam restorations, and they are usually localized asymmetrically [28]. However, OLP lesions are more widespread and bilateral, with symmetrical occurrence attracting attention. A detailed medical history and clinical and histopathological examinations are important in diagnosing an OLR. The differential diagnosis of OLRs from other oral diseases, such as bullous diseases, leukoplakia, lupus erythematosus, etc., can be performed by histopathological examination. The first step in recognition of allergy induced diseases is a detailed history of the present complaint and the clinical course. Hypersensitivity reactions which are cell mediated such as contact dermatitis are demonstrated by using patch testing [29]. The method includes the epicutaneous application of a specific allergen at a defined concentration and in a defined vehicle which will induce a cutaneous inflammatory reaction in a sensitised person, but will cause no reaction in a non-sensitised person. Fregert [30] and many others [16,31,32] described a standard series of dental materials applied to the skin to carry out the epicutaneous test. Hensten-Apaettersen and Holland composed a standard series of allergens for use in epicutaneous tests to elucidate possible contact allergy to amalgam [30]. Dental series epicutaneous test batteries of patch test (Trolab® allergens, Trolab Biagnostics Ltd, Worcestershire, UK) are also commonly used [33]. Namikoshi et al., [34] performed an epicutaneous patch test in 95 participants and found eight of the 17 allergic responders (in which 10.5% were positively tested with mercury) had a history of dermatitis from metal contact. Also, many anti-amalgamists use a patch test with a dilute solution of corrosive mercury salts that cause the skin to redden and possibly swell. The reaction is misinterpreted as a sign of mercury allergy or toxicity [35,36] and furthermore the National Council Against Health Fraud recommended in 2002 that there is no logical reason to worry about the safety of amalgam fillings.

In the present case the restorations were removed under rubber dam and high suction and were replaced with an intermediate restorative material. The lesions healed up after removal of the stimuli. This clearly differentiates the lesion from the OLP, which is usually without an etiology. In patients of OLR, a positive patch test to components of amalgam may help to confirm the diagnosis. Final confirmation, however, depends upon resolution of the lesion after removal of the offending amalgam restoration. When the amalgam restoration has to be removed,

it should always be done using rubber dam, abundant irrigation, and high aspiration volume, to diminish the exposition of the material [37-39].

## Conclusion

It is recommended that patch tests should be performed in patients with OLR if the lesions are in close contact with amalgam fillings. Replacement of such restorations is recommended if there is a positive patch test reaction to mercury or components of amalgam and if there are no signs of concomitant generalized lichen planus.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

All authors contributed equally to the manuscript.

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