

CLINICAL REPORT

Clinical characteristics of an allergic reaction to a polyether dental impression material

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The oral cavity is constantly exposed to substances which may cause an allergic response, and if challenged, the host establishes a T-cell-mediated hypersensitivity reaction.¹ Lymphocytes that are sensitized to a local antigen lead to indurations and reddening after 12 hours with a peak reaction after 24 hours of exposure.² Dental restorative and impression materials³ have been known to elicit such reactions.^{4,5} Clinical manifestations of this condition include burning mouth, severe pain, dryness of the mucosa, and nonspecific stomatitis and cheilitis,⁴ with most patients seeking care at the dental practice after 24 hours.⁵

Polyether impression materials are commonly used in dental practice, with allergic reactions first being described in 1970.¹ The catalyst composition of an older version of this material was consequently replaced with a sulfonium salt catalyst to reduce the potential for allergic reaction. Subsequently, reports of allergic responses have been infrequently published, but a case presentation reported 10 of 2000 patients had allergic reactions to the catalyst methyl dichlorobenzene sulfonate.^{3,5} Patch testing was mostly used to identify the allergen substance in all related studies.^{3,6} However, this type test is more adequate for identifying delayed hypersensitivity (Type IV) than for an immediate hypersensitivity (Type I) reaction.³ The authors have been unable to identify

ABSTRACT

Allergic and hypersensitivity reactions to dental impression materials may occur throughout dental treatment, with diverse manifestations from slight redness to severe pain and a burning mouth with total stomatitis. Patients are often unaware of these allergic reactions, which makes early identification of the cause almost impossible. In addition, symptoms usually begin after 24 hours and mostly in patients with a preexisting history of allergic responses. This report describes a patient with a suspected allergic reaction to a polyether dental impression material during prosthetic rehabilitation associated with a mandibular telescopic denture. Although instances of such occurrence are rare, clinicians need to be aware of these symptoms and select materials carefully for patients with a history of allergy. (J Prosthet Dent 2016;■:■-■)

published visual documentation that would help clinicians better diagnose this condition. Dentists and dermatologists need to recognize the potential adverse effects of using polyether impression materials, especially in patients with a documented history of generalized allergic reactions. In patients who experienced a former hypersensitivity reaction to a polyether material, the magnitude of the response at the second exposure was much higher as a result of the memory effect of the immune response.²

The purpose of this article is to describe the chronology and provide photographic images associated with an allergic reaction to a polyether dental impression material.

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A 74-year-old woman sought care at the Department of Prosthodontics of the Ludwig-Maximilians University, Munich, Germany, for rehabilitation in the left mandible after medication-related osteonecrosis of the jaw and

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Figure 1. Preoperative clinical appearance of mucosa.

several dental procedures resulting in tooth loss (Fig. 1). The patient's anamnesis demonstrated allergic hypersensitivity to patches and Novocain. The patient reported painful redness and swelling of the face and upper body skin area a few hours after the intake of Novocain and the same symptoms, but localized, using adhesive bandages. No other complaints related to food products were reported. Previous breast cancer was treated using intravenous bisphosphonate therapy, alendronate sodium (Fosamax; Merck) 12 years previously, and denosumab (Xgeva; Amgen Inc) as well as zoledronic acid (Zometa; Novartis) for 3 years. Xgeva was replaced by fulvestrant (Faslodex; AstraZeneca) for another 3 years. During the dental procedures, the patient continued with bisphosphonate therapy (Fosamax). After consideration of her history of osteonecrosis and bisphosphonate therapy, the oral surgeons rejected the placement of dental implants. Therefore, prosthetic rehabilitation using a parallel milled telescopic denture, including all 8 remaining mandibular teeth, was provided.

The dental impression was made with a polyether impression material (Impregum Penta; 3M). No patient-related issues were noted at the time of treatment. The patient reported that after the impression procedure, symptoms of dry mouth and a slight swelling and redness began. However, 24 hours later, the patient suddenly presented with pain and swelling of the lips and tongue and redness and white spots of the mandibular mucosa that had been in contact with the polyether impression material. However, breathing and eating were unaffected. Clinical photographs could not be made because of the level of pain the patient was experiencing; even intraoral placement of a dental mirror could not be tolerated. Therapy with an oral antihistamine and antibiotics was discussed with the patient at this time, but she declined this option and elected to use medication for pain relief (ibuprofen 600 mg; Aliud Pharma GmbH) and an antibacterial mouth rinse (Chlorhexamed Forte 0.2% solution, nonalcoholic; GlaxoSmithKline Consumer Healthcare GmbH & Co KG). Twenty-four hours later (48 hours after impression making), intraoral pictures were made (Fig. 2) despite limited mouth opening; the redness and swelling had already subsided. After 10 days, a complete resolution of the intraoral mucosa was observed, enabling further impressions made with a silicone-based material without any signs of allergy or hypersensitivity. Patch testing was performed in the dermatologic department with no dermal reactions on diverse dental ingredients.

DISCUSSION

Although the literature reports only a few instances, the database of the US Food and Drug Administration lists a number of adverse reactions after contact with dental



Figure 2. A, B, Clinical mucosal manifestation 48 hours after making impression with polyether material. All mandibular mucosa that had been in contact with impression material presented swelling, white spots, and redness of the mucosa, symptoms of allergic reaction.

impression materials.³ Patch testing is commonly performed to verify reactions to dental substances,^{3,6} identifying a delayed type of contact allergy³ and is performed by direct component application on the skin, to observe possible cutaneous inflammatory reactions.⁴ This patient related similar allergic symptoms after contact with the polyether impression material as described in the literature,²⁻⁷ allowing a presumptive diagnosis of acute allergic reaction. Patch testing was performed for this patient; however, it did not replicate the allergic reaction, which may have been related to various factors. A major factor may have been that the sulfonium salt used as a catalyst and the polyether macromonomer prepolymer were not tested. These are the main substances that cause the reaction described in the literature.³ An additional factor to consider is related to the type of reaction that occurred. Although no reactions were observed immediately after the impression was removed, the patient related that the first symptoms started to appear approximately 1 hour after treatment. The patient described swelling of the lips and tongue and redness combined with white spots all over the left mandibular mucosa, which were confirmed when she returned 24 hours later. This reaction, within a short period after contact, is indicative of an immediate type of allergy (Type I).³ Patch testing is not the best method of verifying Type 1 reactions.³ Nevertheless, patch testing was indicated for this patient because of possible material allergies. However, patch testing showed no allergic reactions to any of the materials tested.

These allergic instances are quite rare, considering the number of impressions made each year with this type of product.³ However, considering that the symptoms are undesirable and the limitations of any test for this type of allergy, clinicians must know how to identify allergies to polyether and how to select alternative impression materials such as polyvinyl siloxane in hypersensitive patients. In this patient, her history of medication-related osteonecrosis of the jaw required modifications to the

dental treatment, including ulcer treatment. However, the authors were unable to find published reports of associations between this type of allergic responses and the use of bisphosphonate medication. When a silicone-based impression material was used, no further reactions were observed. In this specific situation, the patient's allergic reaction may have been in response to the catalyst, a sulfonium salt, present in the polyether impression material.³

CONCLUSIONS

With the number of allergic reactions reported in clinical dentistry, it is important to identify and describe specific symptoms accurately with clinical images. The selection of an appropriate impression material with minimal allergic potential is essential for treatment success.

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