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CLINICAL AID

Management of the Latex Hypersensitive Patient in the Endodontic Office

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This case report documents the treatment of an endodontic patient who experienced a type I hypersensitivity reaction to latex. The dental, medical, and environmental aspects of treating latex allergic patients are reviewed. Because gutta-percha and latex rubber are similar compounds, the possible cross-reactivity of these materials is discussed.

Endodontists and their staff routinely use latex products during patient care to prevent the transmission of infectious disease and to protect their patients from injury. According to recently published reports in the dental literature, the incidence of latex allergy within the general population and especially within the health care professions is increasing (1–3). Patients with latex allergies pose a problem because many products used in the delivery of dental care, such as treatment gloves, rubber dams, bite blocks, and handpiece hoses, contain latex.

Because latex and gutta-percha share structural similarities, the lay press, health care workers and patients may question the use of gutta-percha in persons who have a documented allergy to latex. Boxer et al. (4) reported a case of a patient with a known latex hypersensitivity who experienced immediate oral discomfort, lip and gingival swelling, urticaria, and dental pain after root canal therapy on a maxillary molar. These signs and symptoms persisted until the patient consulted an endodontist who discovered and subsequently removed an overextended gutta-percha cone from the patient's tooth. The patient then experienced rapid relief of her signs and symptoms. The author concluded that allergic reactions may occur in patients with latex allergy as a result of exposure to gutta-percha during endodontic therapy. This conclusion was reached even though the authors were unable to demonstrate an allergy to gutta-percha in this patient.

The most common allergic reaction to natural rubber latex is type IV delayed hypersensitivity. It is also known as allergic contact dermatitis or chemical allergy and is caused by exposure to the chemicals used in manufacturing latex products. Clinical symptoms are generally delayed but appear within 1 to 48 h after exposure and are manifest as itching, redness, blisters, dry skin, fissures, and sores (1–3). This type of immunological reaction is localized to the contact area and is not systemic.

Another allergic reaction is type I immediate hypersensitivity. It is also known as latex allergy and is caused by the proteins found in natural rubber latex. It occurs within 20 min of exposure and may include hives, itching, flushing, facial swelling, difficulty breathing, abdominal cramps, nausea, increased heart rate, low blood pressure, and anaphylactic shock (1–3). This type of immunological reaction is systemic rather than confined to the local area of contact.

Another reaction is irritant contact dermatitis. This is a skin reaction to the chemicals used in processing latex and manufacturing latex products. The signs and symptoms of irritant contact dermatitis disappear rapidly once the irritant is removed. This reaction is localized to the contact area and is a nonimmunological response.

This case report documents the management of a patient who exhibited a type I immediate hypersensitivity reaction to latex while being treated in an endodontic office. The report also describes the immunological testing and use of gutta-percha as an obturation material in this patient.

CASE REPORT

A 42-yr-old female presented with a chief complaint of past history of significant pain in her maxillary left second molar. She had recently relocated from another state and had just become a patient in the office of a general dentist who referred her for endodontic treatment on tooth 15. The patient's medical history was nonremarkable. The health history specifically asked, "Are you allergic to any medications or substances—aspirin, penicillin, codeine, acrylic, metal, latex rubber, others?" There was space for a patient's written comments concerning allergies. The patient circled "no" for this question and did not write any comments under this question.

A clinical exam showed that tooth 15 was sensitive to percussion, tested nonresponsive to cold and an electric pulp test. No periapical pathology was visible on a preoperative radiograph (Fig. 1). A diagnosis of pulpal necrosis was made, and the patient consented to endodontic therapy on tooth 15. The patient was

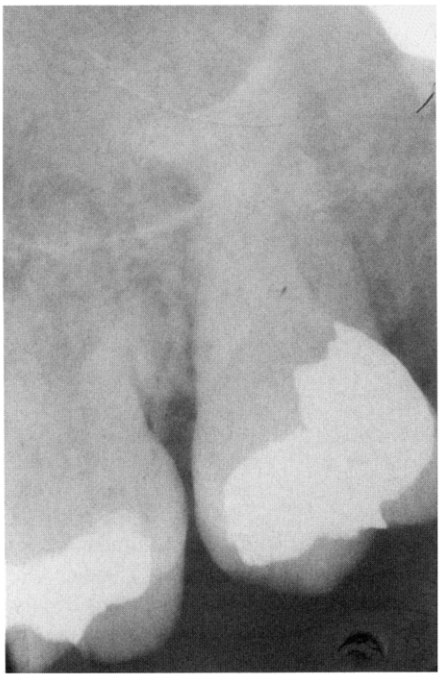

FIG 1. Preoperative radiograph tooth 15.

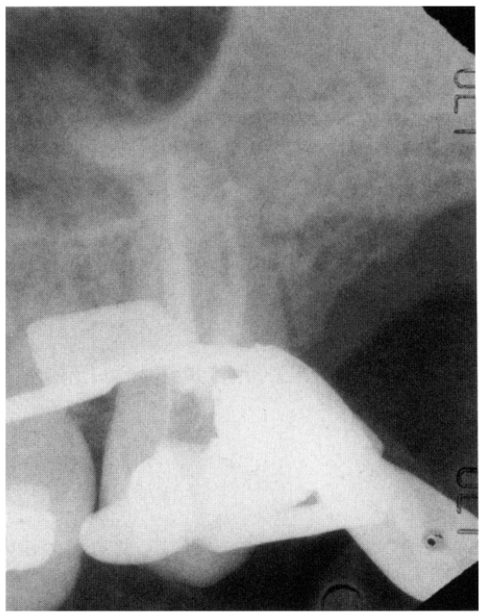

FIG 2. Postoperative radiograph tooth 15.

anesthetized, tooth 15 was isolated with a rubber dam, and endodontic therapy was initiated.

During instrumentation of the root canals, the patient began to complain of itching and burning of her skin, which was in contact with the rubber dam. A rubber dam napkin was placed and root canal instrumentation was completed. The tooth was sealed with a temporary restoration, and the patient was informed another appointment would be made for obturation.

Immediately upon removal of the rubber dam, the patient complained of increased burning and itching, as well as a tightness in her throat. There was now a rash on the sides of her neck that extended down both arms. None of these signs or symptoms had been present before the endodontic procedure.

When the patient was again questioned about her health history, she related a similar experience in her hometown dentist's office. She said her previous dentist thought she might be allergic to latex gloves or something else in the office. At that time, she had taken over-the-counter Benadryl (Warner-Lambert, Morris Plains, NJ) for her symptoms and her condition improved. Because no testing had been done to confirm a specific allergy, she denied the presence of allergies on her current health history. The patient was given an immediate oral dose of 50 mg diphenhydramine and a prescription for 16 tablets of diphenhydramine (50 mg) with instructions to take 1 tablet four times a day. The patient remained at the endodontic office for 45 min to ensure the allergic reaction would not become worse and was then dismissed.

When the patient was called that same evening, she stated her tooth was fine, but that she had been somewhat disoriented while driving home although she arrived home without incident. Her allergic symptoms were gone, but she had a headache and still felt disoriented. The patient consented to allergy testing before completion of her root canal.

A few days later, the matter was further complicated by a call from the patient stating that she had talked with her hometown physician. Her physician stated he personally was latex hypersensitive and related a history of "root canal problems" because of the gutta-percha that had been used in his tooth. She was advised by the physician to not have gutta-percha used in her tooth, because it was a natural rubber product. The patient was again advised by the endodontic office that allergy testing was essential to confirm suspected allergies to dental materials.

Through a local physician, the patient was referred to an allergy and asthma center to be tested by an immunologist. The immunologist requested from the endodontic office a sample of nonlatex, as well as latex-containing rubber dam, vinyl gloves, and gutta-percha. The immunologist then performed a RAST and skin test. The RAST screen test for latex was positive at class 3 (high). A skin testing procedure was then done using the materials furnished by the endodontic office. The only material she reacted to was the latex-containing rubber dam. Based on the results of the two tests, a diagnosis of latex hypersensitivity was made. The immunologist advised the patient that gutta-percha and other nonlatex dental materials could be safely used.

The patient was given instructions by the immunologist to strictly avoid latex-containing materials. She was also instructed to carry an EpiPen (Dey Laboratories, Napa, CA) and Benadryl Elixir (4 tsp at first signs of a reaction). In the copy of the report to the endodontic office, the immunologist suggested as a precautionary measure the patient use prednisone (40 mg) orally on the day before, the day of, and possibly the day after her procedure. Benadryl (or other suitable antihistamines) could be used intraoperatively, with a 50-mg dose 1 to 2 h before the procedure and then every 6 h subsequently if symptoms warrant.

On the patient's second visit to the endodontic office, she was given the first morning appointment. The patient was premedicated with 50 mg of oral diphenhydramine taken 1 h before her appointment and accompanied by a friend who drove her to the office. Nonlatex-containing rubber gloves were used by the treating dentist and assistant. A sheet of nonlatex rubber dam was used to isolate tooth 15. Care was taken to keep the rubber hoses of the handpieces and suction off the patient's skin. Tooth 15 was obturated with vertically condensed gutta-percha and Pulp Canal Sealer (Kerr, Romulus, MI) (Fig. 2). The patient tolerated the procedure well and had none of the signs or symptoms present at her first

visit. When the patient was called that evening she was comfortable and in no distress. When the patient was contacted several months later, she stated tooth 15 was asymptomatic, but refused to return for a recall examination.

DISCUSSION

This case demonstrates the importance of identifying patients with latex hypersensitivity. If the patient answers yes to written and oral screening questions about latex or rubber allergies, but has not been tested, immunological testing for allergies to latex and gutta-percha are recommended. Allergy testing should be conducted by an immunologist and a written report forwarded to the treating dentist to become part of the patient's record. If the patient has a documented latex allergy, but has not been tested for sensitivity to gutta-percha, then immunological testing for gutta-percha sensitivity is strongly advised.

As this case report demonstrates, there is *not* an automatic cross-reactivity with gutta-percha in patients who are allergic to latex. Gutta-percha used in dentistry and the natural rubber latex found in treatment gloves and rubber dams are significantly different. Gutta-percha is derived from the juice of the Taban tree (*Isonandra percha*), which is in the same botanical family as the rubber tree (*Havea brasiliensis*). Gutta-percha occurs naturally as 1,4-polyisoprene and is harder, more brittle, and less elastic than natural rubber (5). Modern commercially prepared gutta-percha obturation cones contain approximately only 20% of the natural product. The difference in chemical make-up and manufacturing process of natural rubber latex and gutta-percha could produce minimal cross-reactivity.

If a patient were found to be allergic to gutta-percha, what obturation material should be used? Theoretically, if the gutta-percha could be completely confined within the root canal space and encased in sealer, no antigen would be present to react with the body's immune system. Other obturation materials, such as silver points and paste fills, have been discussed in the literature, but have significant disadvantages when compared with gutta-percha (4–6).

If the patient is found to be latex hypersensitive, there are several precautions that can reduce the risk of an allergic reaction occurring in the dental office. The patient must avoid contact with latex containing dental handpiece hoses, suction hoses, latex nitrous oxide unit nosepieces and hoses, as well as treatment gloves and rubber dams. Nonlatex rubber dam and gloves can be used (2, 7, 8).

The ambient air in the dental office is another route that can predispose a patient to a hypersensitivity reaction. The air in dental offices easily becomes contaminated with the cornstarch powder that is used to facilitate glove placement. This suspension of powder occurs due to the gloving and degloving of dental health care workers during the process of patient care. The cornstarch powder can bind the proteins and chemicals in latex rubber that serve as allergens. If the latex hypersensitive individual inhales the aerosolized powder-protein suspension, an allergic reaction could be initiated. At the end of the workday, suspended powder settles or is filtered out of the air through the office's air circulation equipment. Patients with a latex hypersensitivity or allergy should be scheduled at the beginning of the office workday when the level of powder contamination in the air is at a minimum. A thorough wipe down of office equipment before the patient's appointment is also recommended (9). Because it is impossible to remove all latex-containing materials from the dental office, patients with an extreme sensitivity to latex or rubber should consult with their physician regarding premedication with prednisone or Benadryl (2).

Endodontists should know the signs and symptoms of delayed and immediate hypersensitivity latex allergic manifestations and be prepared to handle such medical problems. Delayed hypersensitivity reactions are manifest generally as skin reactions: itching, redness, dry skin, fissures, and sores. These reactions occur within 1 to 48 h after exposure to the antigen. Should a patient develop any of these conditions, the dental procedure should be discontinued and the patient removed from direct contact with latex containing products (e.g. rubber dam and gloves). Immediate management of delayed hypersensitivity reactions includes monitoring of vital signs and the administration of an oral antihistamine, either diphenhydramine or chlorpheniramine. The oral dose of diphenhydramine for adults is 25 to 50 mg three to four times a day, and for children over 20 lbs, the oral dose of diphenhydramine is 12.5 to 25 mg three to four times a day. For chlorpheniramine, the oral adult dosage is 2 to 4 mg three to four times a day, and the children's dosage is 2 mg every 4 to 6 h (10).

Should the patient be in the dental office when a reaction occurs, do not allow the patient to leave until the clinical signs and symptoms have resolved. Patients who have been given an antihistamine should not be allowed to leave the office alone or drive because of the possible side effects of drowsiness and fatigue. If the delayed hypersensitivity reaction occurs after the patient leaves the dental office, the patient should be advised to return to the dental office, see his/her physician, or report to the emergency room of a hospital immediately (10).

Immediate hypersensitivity reactions occur within 20 min of exposure to the antigen and should be managed more aggressively. The signs and symptoms of this type of reaction include hives, itching, facial swelling, difficulty breathing, increased heart rate, and low blood pressure. Definitive management for an immediate allergic reaction will depend on the presence or absence of cardiovascular and/or respiratory involvement. If there is no evidence of cardiovascular or respiratory involvement, management of the patient is the same as for a delayed hypersensitivity reaction, including the administration of an antihistamine. If the patient does exhibit signs of cardiovascular or respiratory distress, additional medical intervention would include basic life support measures, emergency medical assistance, administration of oxygen, and intramuscular or subcutaneous administration of epinephrine. The adult dosage is 0.3 to 0.5 mg of 1 : 1000 epinephrine, and the child dosage is 0.25 mg. Epinephrine can also be administered through use of an EpiPen every 5 to 20 min as needed for a total of three doses (10).

Any patient who experiences a hypersensitivity reaction should be referred to an allergist for definitive diagnosis before continued endodontic treatment.

It would seem prudent for endodontists to adhere to the following guidelines:

- Specific questions about rubber or latex allergies should be included on the health history form and followed-up with verbal confirmation.
- If an allergy to latex is suspected, but unconfirmed, the patient should be referred to an allergist for testing to include gutta-percha. For emergency dental treatment, use nonlatex treatment gloves and rubber dam.

- Consider premedication with prednisone and diphenhydramine after consultation with the patient's physician.
- Prepare to manage an allergic reaction, including use of epinephrine such as an EpiPen.

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