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# Mishaps during Composite Restoration: Acute Allergic Angioedema and Contact Dermatitis

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## ABSTRACT

Unexpected results and negligence can lead to mishaps in the dental operatory. With the trend of using tooth colored restorations mishaps have also increased which are sometimes ignored due to lack of knowledge. Although, resin based restorative materials are considered safe, their constituents can leach out and cause allergies in patients as well as dental professionals. Safe handling of these resin based materials is critical due to increased risk of occupational health hazards. Most of the allergies caused by resins are related to monomers based on methacrylic acid which is found in almost all types of dentin bonding agents. Also, it is estimated that 5% to 10% of all allergic contact dermatitis reports in dental professionals are due to contact with methacrylate. On the contrary, 37% phosphoric acid in etchant results in necrosis and ulcerative lesions due to vascular nature of the oral cavity. The purpose of this article is to help dentists to become aware of allergies/mishaps that can occur due to bonding agents and phosphoric acid, thereby leading to prevention and their early management.

**Keywords:** Allergic contact dermatitis; Bonding agents; Allergic reaction; Anaphylaxis; Angioedema; Dental allergens; Mucosal burn; Acid etching; Adverse reaction; Hypersensitivity reaction

## INTRODUCTION

Wretched and unforeseen occurrences can occur during dental treatment. Most common being anaphylactic reactions to local anesthetics, allergic reactions to dental materials, antibiotics, nonsteroidal anti-inflammatory drugs, etc. A patient with orofacial edema arouses several possibilities in the dental practitioner's mind [1]. However, rare diseases may mimic or present similarly to common diseases, resulting in a "medical mystery." Such diagnostic quandary can be disturbing for both the patient and the dentist.

The resin based restorations as well as their constituents must satisfy the biocompatibility testing as they are indicated for a long time period in the mouth and can cause allergic reactions in the form of urticaria, swelling, rash, contact allergy and rhinorrhea. The clinical features include burning, pain and dryness of mucosa, nonspecific stomatitis and cheilitis. Composites, latex gloves, local anesthetic agents, endodontic materials, impression materials, and metals are some of dental materials suspected with biocompatibility issues.

The demand for esthetics has increased the application of the acid-etch technique thus increasing the use of phosphoric acid as an etchant. 30% to 40% phosphoric acid is the most used concentration however the chemical is potentially caustic in higher concentrations. In a review of local and

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systemic responses related to the effects of dental restorative materials, Stanley found that inappropriate acid etching procedures with 50% phosphoric acid could lead to ulceration and sloughing of oral tissues [2]. To date, adverse reactions caused by its contact with the oral mucosa are rare except for the references to such occurrences only in oral pathology texts [3-5].

Allergic Contact Dermatitis (ACD) is a non-infectious inflammatory disease of the skin characterized by a delayed hypersensitivity reaction (type IV T-cell-mediated) due to contact with methacrylate present in bonding agents [6,7]. The first case report that follows showed an adverse reaction to etchant thus indicating the need of taking precautions to prevent its spillage in undesired areas while the purpose of second case report was to promote the awareness regarding the allergies due to methacrylate in bonding agents when placed on gloved hands during composite restorations.

## CASE PRESENTATION

### Case 1

A 32 years old male patient working in a local pharma company attended for dental treatment at Bhojia dental college and hospital. He was treated by an intern, and as a treatment plan composite restoration was to be carried out in 37. Rubber dam isolation could not be accomplished due to the recalcitrance of the patient.

The ivoclar Te-Econom plus composite material was used. While etching the surfaces with 37% phosphoric acid of a lower left second permanent molar, the applicator tip of the etchant contacted the upper lip leading to accidental spillage of the acid (**Figure 1a**). In the process of cleaning the etchant with the gloved hands, phosphoric acid also encountered the cheek on the right side and area below the supraorbital ridge of the eye on left side (**Figure 1b**). Meanwhile, the patient started complaining of itching and swelling over the affected area. The clinical examination revealed a diffuse, painless, pale, soft, non-tender, non-pitting erythematous swelling without the evidence of erosion and ulceration. The patient gave no history of allergy. The vital parameters measured were normal. On further examinations, no other signs and symptoms were diagnosed. As the patient seemed stable, he was discharged with the prescription of prednisolone 10 mg and cetirizine 10 mg orally, once daily for 3 days. Follow-up examination after 24 hr showed a resolution of swelling drastically (**Figure 2a**). The patient reported that he didn't take the medications due to some emergency work and instead applied glycerine and coconut oil which was readily available with the patient and there was an improvement in symptoms (**Figure 2b**). A follow-up examination after 2 months revealed no sign of previously reported lesions (**Figure 2c**). The diagnosis of acute allergic angioedema of upper lip was made based on the following criteria, the swelling was sudden in onset, limited to oral mucosal regions, absence of pain, pruritus, pitting, and erythema and the symptoms subsided in 24 hr.


**Figure 1:** a) Swelling of lip on the left side; b) Sloughing of cheek on right and left side, peeled off skin on the left eye just below the supraorbital ridge.


**Figure 2:** a) Follow-up after one day; b) One month; c) Two months follow-up.

### Case 2

A post-graduate resident was performing esthetic restorations on anterior teeth with composite resin. Despite of practicing all standard measures of infection control including gloves and maintaining the cleanliness of the working area, the bonding agent came in contact with the gloved hand for around 34-40 minutes (**Figure 3a and 3b**). As soon as the resident noticed the contamination and mild itching, he immediately replaced his gloves. The dorsum of the left hand was affected the most which was thereafter recalled by the resident as his habit of placing the bonding agent over the gloved area for ease and convenience (**Figure 3c**). The application of topical corticosteroid cream for a few days relieved his signs and symptoms (**Figure 3d**).

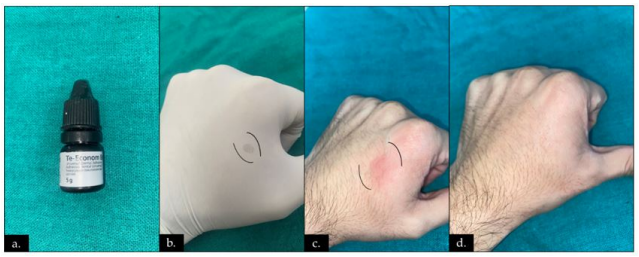


**Figure 3:** a) Dentin bonding agent (DBA); b) Application of DBA over the dorsum of left hand; c) Redness over the affected area; d) Redness resolves after 3-4 days.

## RESULTS AND DISCUSSION

The introduction of resin composites in 1950's has revolutionized the current dental practice. A saying describing the resin composites aptly "Nothing is free everything in life comes with the price so is the resin-based composites with

their allergies. As these are tooth colored restorations, there demand is booming at a much faster rate and so are the mishaps associated with them. A matter of utmost importance is the accidents associated with the use of etchant and bonding agent. The first case was diagnosed with acute allergic angioedema of upper lip due to the mishandling of 37% phosphoric acid by the intern. In such cases, the first line of treatment is oral antihistamines if it does not help corticosteroids/antihistamines intravenously should be administrated.

Frequent monitoring of the patient should be done till the symptoms subside. Careful attention when using etchant along with the proper use of rubber dam is a must to avoid such mishaps. Precautions include the proper identification as well as the exclusion of the causative agent. Educating the patient regarding the symptoms and management strategies are essential in these cases. The diagnosis of cheilitis granulomatosa and cheilitis glandularis as the cause was ruled out as there were no signs of ulceration in the case.

In the second case, the post-graduate resident was diagnosed with Allergic Contact Dermatitis (ACD) as he applied bonding agent on his left hand during the restorative procedure. Incidence of 5% to 10% of all ACD in dental health care team members are due to methacrylate [8,9]. The primary manifestation of methacrylate present in bonding agent is eczematous rash [10,11]. Also, repeated exposure to unpolymerized methacrylate may cause finger or hand neuropathies, with burning or prickling sensations. A detailed history from affected colleagues and interns on placement on bonding agent was also taken in which each student described applying uncured dentin bonding adhesive material on the gloved area. The reason given for bonding agent application on hand was to lubricate the composite placement instrument while placing and packing uncured paste into the cavity and to prevent instrument/composite sticking. However, it is possible that other constituents in the bonding agent led to the development of redness and itching.

Prevention is always better than cure. These two case reports highlighted that dental health professionals must be aware of all the possible allergic manifestations due to inattention to detail and negligence.

## CONCLUSION

Having encountered the hazardous complications, we as dentists should be prepared to expect the unexpected situations when confronted and to render the most decisive treatment possible. Regular use of rubber dam should be encouraged to prevent perilous effects of etchant containing 37% phosphoric acid and bonding agent used in the esthetic procedures, which is ultimately the main bread earner for the clinician in present esthetic world.

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## CONFLICT OF INTEREST

The authors do not have any financial interest in the companies whose materials are included in this article.

## CONSENT STATEMENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy. Informed consent was also obtained from the patient informing the clinical procedure to be carried out and its related complications which are attached below.

## REFERENCES

1. Kulthanan K, Jiamton S, Boochangkool K, Jongjarearnprasert K (2007) Angioedema: Clinical and etiological aspects. Clin Dev Immunol. 2007:26438
2. Stanley HR (1993) Effects of dental restorative materials: Local and systemic responses reviewed. J Am Dent Assoc. 124(10):76-80.
3. Regezi JA, Sciubba J, Jordan RC (2016) Oral pathology: Clinical pathologic correlations. Elsevier Health Sciences.
4. VJ B (1994) Red and white lesions of the oral mucosa. In: Lynch MA. Brightman VJ, Greenberg MS, editior. Burketts oral medicine: Diagnosis and treatment. Rashid Latif Medical College, Pensyvania. 58-59.
5. LR E (1992) White Lesions. Clinical outline of oral pathology: Diagnosis and treatment. 3rd edition. Pennsylvania, Lea and Febiger. 9-29.
6. Milia E, Cumbo E, Cardoso RJ, Gallina G (2012) Current dental adhesives systems. A narrative review. Curr Pharm Des. 18(34):5542-5552.
7. Martin SF (2015) Immunological mechanisms in allergic contact dermatitis. Curr Opin Allergy Clin Immunol. 15(2):124-130.
8. Sanchez-Perez J, Gonzalez-Arriba A, Goiriz R, Garcia-Diez A (2008) Occupational allergic contact dermatitis to acrylates and methacrylates. Contact Dermatitis. 58(4): 252-254.
9. Hunasehally RY, Hughes TM, Stone NM (2012) Atypical pattern of (meth) acrylate allergic contact dermatitis in dental professionals. Br Dent J. 213(5):223-224.
10. Wrangsjo K, Swartling C, Meding B (2001) Occupational dermatitis in dental personnel: Contact dermatitis with special reference to (meth) acrylates in 174 patients. Contact Dermatitis. 45(3):158-163.
11. Hamann CP, Rodgers PA, Sullivan K (2003) Allergic contact dermatitis in dental professionals: Effective diagnosis and treatment. J Am Dent Assoc. 134(2):185-194.