



CLINICAL MANIFESTATIONS OF INTRAORAL CONTACT HYPERSENSITIVITY AMONG DENTAL PATIENTS WITH METHACRYLATE ALLERGY

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ABSTRACT

After acrylic resins have been developed they found a broad area of application. Today they have totally replaced amalgam and are used in restorative materials, root canal filling materials, bonding materials and glass ionomers, as well as the fabrication of dental prostheses. As a consequence, the number of allergic reactions to these materials is constantly increasing.

Purpose: The aim of this study was to evaluate the most common intraoral clinical manifestations of allergic reactions to plastic materials used in dentistry.

Materials and methods: The study population consisted of 200 interviewed participants divided into two groups: dental patients with methacrylic restorations and manicurists and dental technicians, occupationally exposed to methacrylates. All of them had undergone dental treatments with acrylic materials. Of them, 154 were patch-tested with 24 methacrylate allergens compiled from (Meth)Acrylate Series Adhesives, Dental & Other, (Meth)Acrylate Series - Nails Artificial Series (MN- 1000) (Chemotechnique Diagnostics Vellinge, Sweden). Thirty patients (19.48%) showed positive reactions to the substances tested.

Results: Erythema was observed in 8 patients (26.66%), whereas edematous changes in the oral tissues were found in 4 patients (13.33%). In 60% of the patients with positive reactions, no intraoral findings were identified. Aphthous or lichenoid eruptions which are specific for contact allergy to dental materials were not registered during intraoral inspections.

Conclusions: The results of this study cannot confirm presence of specific intra- or extra oral changes pathognomonic for methacrylate allergy in dental patients.

Key words: intraoral allergic reaction, methacrylate allergy, contact hypersensitivity, patch test, dental acrylic resins.

INTRODUCTION

The use of acrylic resins in conservative and prosthetic dental treatment has drastically increased with the growing esthetic demands of dental patients. They replaced amalgam fillings that contain metals and frequently cause intraoral contact reactions [1]. However, methacrylates are also strong sensitizers likely to induce allergies after a prolonged period of close contact with oral tissues [2].

Development of hypersensitivity among staff occupationally handling acrylics is frequently seen but among dental patients is very rare [3, 4, 5]. Contact allergy involving the oral mucosa is a poorly understood condition described mainly in case reports. These reactions often have a non-specific clinical appearance – data concerning this problem are scarce in medical publications [6].

Like any material for medical use, acrylics are estimated by their cell/tissue compatibility. This characteristic feature is influenced by the monomer polymer conversion. The rate of conversion is estimated to be in the range 35-77% when the process occurs intraorally. Due to this low degree of polymerization the local biocompatibility of acrylic resins is impaired. Leachability of monomer molecules can be the possible cause of irritation and hypersensitivity [7, 8, 9 10] Cases of allergic reactions after placement of acrylic materials have been reported, although scarcely, in specialized publications

There are no data on the clinical presentation of allergy to dental acrylics. Symptoms vary widely and are likely to result in misdiagnosing [11, 12, 13].

Summarizing patients' complaints after treatment with acrylic materials is useful for improving the quality of the diagnostic process. The aim of this study was to determine the most prominent clinical signs of intraoral contact hypersensitivity to dental acrylics.

MATERIALS AND METHODS

Patients

Over a period of three years, patients wearing complete or partial dentures, fixed prosthodontic restorations and composite fillings were clinically examined. All participants in the group of dental patients reported that symptoms started after placing new prostheses, relining the old ones or placing composite fillings. The group of the occupationally exposed had predominantly skin changes. 154 patients having complaints of allegedly allergic etiology were patch-tested, 28 of which (18.18%) were males and 126 (81.81%) were females.

Anamnestic data were obtained by a questionnaire including information on the type, localization and onset of intraoral symptoms. Additional information regarding the durability of dental acrylic restorations was also obtained. A history of atopy or an allergic reaction to drugs or food was also taken. The oral examination included registration of all dental restorations, as well as all oral lesions likely

to be related to adverse reactions to the resin materials used in the dental treatment.

Epicutaneous test

Patch test was performed with the acrylic monomers of (Meth) Acrylate Series Adhesives, Dental & Other (Chemotechnique Diagnostics Vellinge, Sweden), IQ Chambers® (Chemotechnique Diagnostics®, Vellinge, Sweden). The number of allergens used was 24 covering the complete range of haptens in (meth)acrylic allergens from (Meth)Acrylate Series - Nails Artificial Series (MN- 1000). The patches were removed after 2 days and readings were performed on days 3 and 7. The diagnosis of contact allergy was based on an evaluation of the clinical manifestation and the results of the patch test.

The results of the patch test were recorded as follows:

- + Weak positive reaction (non-vesicular, erythema, infiltration, papules)
- ++ Strong positive reaction (erythema, papules, infiltration or vesicular)
- +++ Extreme positive reaction (bullous, ulcerative)
- Df - Doubtful reaction (macular erythema only)
- Ir - Irritant reaction
- Neg - Negative reaction

Statistical analysis

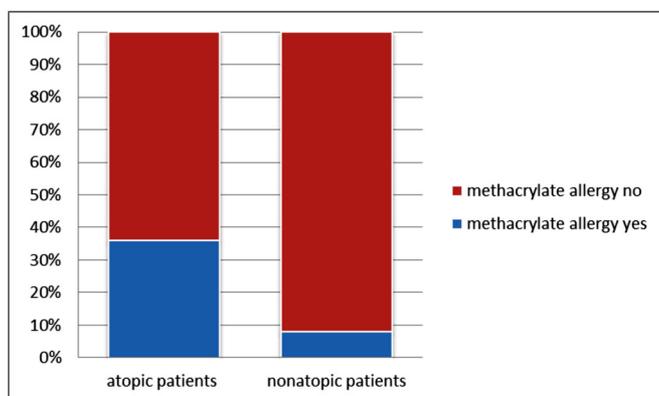
The statistical analysis was performed using the SSPS 19.0 program. We used Pearson chi-square test. A *p*-value of less than 0.05 was chosen as the level of significance.

RESULTS AND DISCUSSION

After summarizing the results obtained by our study, 30 patients (29 females and 1 male) (19.48%) were found to have shown one or more positive reactions.

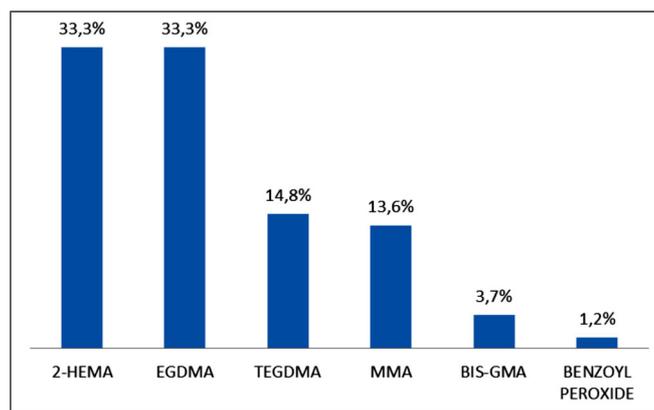
The patients with positive patch test reactions to acrylates who reported a history of atopic disease were 11 (36%), which is significantly higher, as compared to the control group of 13 patients (8%), *p*<0.05 (Table 1). There was no statistically significant difference between the patients with positive patch test results and the control group regarding the history of food and drug allergy.

Table 1. Methacrylate Allergy/Atopy



We observed a total of 81 positive reactions. The most frequent methacrylic monomers recorded in our study had the following distribution: 27 (33.33%) to 2-Hydroxyethyl methacrylate, 27 (33.33%) to Ethylene glycol dimethacrylate, 12 (14.81%) to Triethylene glycol dimethacrylate, 11 (13.58%) to Methyl methacrylate, 3 (3.70%) to Bisphenol A glycerolate dimethacrylate (BIS-GMA), 1 (1.23 %) to Benzoylperoxide (Table 2).

Table 2. Frequency of positive reactions to methacrylic monomers



The most prominent subjective complaints of the patients with positive patch test results were burning sensation (26.66%), eating difficulties (16.66%), taste disturbance (6.66%), dryness (3.33%), itchiness (3.33%), and pain (3.33%).

The clinical observation of the dental patients revealed the following intraoral findings: erythema (26.66%) and edema (13.33%). These pathological changes were in the areas of direct contact with the prosthetic appliances. Erythema and edema were observed under dentures mainly of the upper jaw, corresponding to the shape and outline of the prosthetic restoration. No aphthous or lichenoid lesions were found. Despite the skin sensitization to methacrylates, about two thirds of the subjects studied (from the group of occupationally exposed) did not show any intraoral changes. Only 1 occupationally exposed person (3.33%) had extraoral changes of perioral dermatitis.

The clinical appearance of hypersensitivity reactions to contact allergens in most instances was characterized by macular erythema, papules, vesicles or even bullae in acute episodes. The chronic contact reactions were described as lichenified, scaled and fissured skin sites. In the oral environment, all these characteristic features are rare and some of them never observed because of their rapid development. The morphology of contact stomatitis is not distinctive because it is presented by nonspecific pathological alteration.

CONCLUSIONS

The results of our investigation showed that one-fifth of the patients with complaints related to methacrylate dental treatment could be due to allergic pathogenesis. In most of the cases studied no intraoral changes were observed. The fact that hypersensitivity to methacrylic monomers is

constantly increasing/, confirms the necessity of allergy tests. Careful allergy-focused history and patch testing should be included in the set of medical evaluations for covering all possibilities in the differential diagnosis. The list of intra- and extraoral findings in our patients comprises mainly nonspecific clinical signs, this study cannot confirm presence of pathognomonic changes for methacrylate allergy in dental patients.

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