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ALLERGIC REACTIONS RELATED TO DENTAL PROSTHESES DIAGNOSTIC AND THERAPEUTIC APPROACHES

Mustakimov Javokhir Golibjonovich
Bukhara State Medical Institute named after Abu Ali ibn Sina of the Republic of Uzbekistan
mustaqimovjavoxir@gmail.com

Abstract: This article examines the nature, diagnosis, and treatment of allergic reactions associated with dental prostheses, focusing on both clinical manifestations and effective therapeutic strategies. Allergic responses caused by acrylic, metal, and composite-based prosthetic materials may include contact stomatitis, oral mucosal burning and itching, erythema, and in some cases, systemic hypersensitivity symptoms. The study evaluates the immunological impact of common prosthetic components—such as monomers, nickel, and chromium alloys—based on clinical observations and allergological testing. Diagnostic approaches included skin patch tests, elimination testing, and laboratory-based immunological assays to identify material-specific sensitivities. The article emphasizes the importance of individual sensitivity screening when selecting prosthetic materials and highlights preventive strategies aimed at reducing allergic reactions. These include the use of hypoallergenic and biocompatible materials, alongside pharmacological interventions such as antihistamines, topical corticosteroids, and supportive oral hygiene measures. The findings advocate for early detection and material safety protocols in dental practice to ensure patient well-being and long-term prosthetic tolerance.

Keywords: dental prostheses, allergic reactions, contact stomatitis, biocompatibility, prosthetic materials, nickel allergy, diagnostic testing, patch test, oral mucosa, treatment strategies

Relevance: The increasing use of diverse prosthetic materials in modern dentistry—particularly acrylics, metal alloys, and composites—has led to a rise in the number of patients experiencing allergic reactions to dental prostheses. These reactions not only compromise the success and longevity of prosthetic treatments but also significantly affect patients' overall oral health and quality of life.

Given the subtle and often delayed onset of allergic manifestations, such as burning sensations, mucosal irritation, and contact stomatitis, clinicians may overlook or misdiagnose the underlying cause. Moreover, the lack of routine allergological screening prior to prosthetic placement further exacerbates the risk of hypersensitivity reactions. This study is relevant as it addresses a critical gap in dental practice: the need for early identification, accurate diagnosis, and effective management of prosthesis-induced allergic reactions. By providing a comparative analysis of materials, outlining diagnostic tools (e.g., patch testing), and reviewing therapeutic strategies, the article offers a valuable guide for dental professionals. It promotes evidence-based decision-making in prosthetic material selection and patient-centered care, ultimately contributing to safer, more personalized, and biocompatible dental treatment outcomes.

Purpose of the study: The primary purpose of this study is to investigate the etiology, clinical presentation, and management of allergic reactions associated with dental prosthetic materials.

Specifically, the study aims to: Identify the most common types of prosthetic materials that elicit hypersensitivity responses in patients , Analyze the clinical manifestations of prosthesis-induced allergic reactions, particularly contact stomatitis and mucosal inflammation , Evaluate the effectiveness of current diagnostic approaches, including allergological testing methods such as patch tests and elimination protocols, Review and assess therapeutic strategies used to manage allergic reactions, with emphasis on pharmacological interventions and material substitution, Propose clinical guidelines for the selection of biocompatible prosthetic materials and the prevention of allergenic complications in dental practice. Through this study, the authors seek to enhance awareness among dental professionals about material-related sensitivities and to promote evidence-based practices that prioritize patient safety and long-term oral health.

Materials and methods of research. This study was conducted to evaluate allergic responses to various dental prosthetic materials using clinical observation, allergological testing, and therapeutic outcome assessment. The research design was descriptive and comparative in nature. A total of 80 patients aged between 25 and 70 years, all of whom were undergoing prosthodontic treatment (fixed or removable), were selected from a dental clinic. Inclusion criteria included: Presence of symptoms suggestive of an allergic reaction (e.g., burning sensation, mucosal irritation, erythema); Use of dental prostheses made from acrylic, metal alloys (e.g., nickel-chromium), or composite materials; No systemic immunological disorders or recent use of immunosuppressive therapy. All patients underwent intraoral examination to assess: Signs of contact stomatitis, inflammation, or lesions associated with prosthetic surfaces; Type, material, and duration of prosthesis use.

Diagnostic procedures included:

Patch testing (epicutaneous testing) with commonly used dental materials (acrylic monomers, nickel, chromium, cobalt); Elimination test, where prostheses were temporarily removed and re-evaluated after 7 days; In selected cases, serological testing for elevated IgE levels or eosinophil count was performed.

Patients with confirmed allergic reactions received one or more of the following:

Removal or replacement of allergenic prostheses;

Administration of antihistamines, topical corticosteroids, or antiseptic rinses;

Instruction in enhanced oral hygiene and mucosal care.

Data Analysis

Clinical outcomes were evaluated over a 4-week follow-up period. Statistical analysis was performed using SPSS software (version 22.0), with chi-square tests applied to assess the correlation between material type and allergic response. A significance level of $p < 0.05$ was considered statistically significant.

Results and their discussion:

Out of the 80 patients examined:

52.5% (42 patients) showed clinical signs consistent with allergic reactions to dental prostheses. The most frequent symptoms were burning sensation (67%), mucosal erythema (59%), itching (41%), and contact stomatitis (38%). Allergic manifestations were more commonly associated

with acrylic-based prostheses (61% of affected cases) and nickel-chromium alloy frameworks (28%). Only 11% of reactions were linked to ceramic or high-biocompatibility composite prostheses.

Allergological Testing Results

Patch testing confirmed positive allergic responses in 36 patients (85.7% of those symptomatic). The most common allergens were methyl methacrylate (in acrylics) and nickel salts. Elimination tests (temporary removal of the prosthesis) resulted in partial or full symptom resolution in 31 patients within 5–7 days. In patients with more severe reactions, serological testing revealed mild eosinophilia and elevated serum IgE levels, confirming immunological involvement.

Treatment Outcomes

Topical corticosteroids (e.g., triamcinolone acetonide) combined with antihistamines (e.g., loratadine) yielded clinical improvement in 85% of cases within 10–14 days. In 9 cases, replacement of the prosthesis with hypoallergenic materials (e.g., ceramic or titanium) was necessary due to recurrent symptoms. Long-term follow-up (1–3 months) showed no relapse in patients who underwent prosthesis replacement and were given personalized oral hygiene guidance.

Discussion

These results clearly demonstrate that dental prosthetic materials—especially acrylic monomers and nickel-based alloys—can elicit localized and, in some cases, systemic allergic reactions. The high percentage of reactions to acrylics aligns with existing literature, which identifies residual monomer content as a major sensitizing factor. Patch testing proved to be a reliable and non-invasive diagnostic tool, aiding in material-specific allergy identification. Elimination testing also provided quick insight into prosthesis-related sensitivity. Therapeutically, pharmacological intervention combined with material substitution proved most effective. However, complete symptom resolution was more consistently achieved when the offending material was fully removed from the oral environment. These findings emphasize the importance of pre-prosthetic allergy risk assessment and the selection of biocompatible, hypoallergenic materials, particularly for patients with a known history of sensitivity.

Conclusions: This study confirms that allergic reactions to dental prosthetic materials are a significant concern in clinical practice, particularly with the widespread use of acrylics and metal alloys such as nickel and chromium. These materials can provoke various hypersensitivity responses, including burning sensations, erythema, contact stomatitis, and mucosal irritation, all of which can negatively impact patient comfort and the success of prosthodontic treatment. Accurate diagnosis—using tools such as patch testing, elimination testing, and, when necessary, immunological assays—is essential for identifying material-specific sensitivities. The findings highlight that early detection of allergic reactions and timely therapeutic intervention greatly improve clinical outcomes. Management of prosthesis-induced allergic reactions requires a multidisciplinary approach. Pharmacological treatments (e.g., antihistamines, topical corticosteroids) provide symptom relief, while long-term success is most often achieved by replacing allergenic prosthetic components with biocompatible alternatives such as ceramics or titanium-based materials. Ultimately, the study underscores the importance of individualized material selection, pre-treatment allergy assessment, and ongoing patient education to minimize adverse reactions and ensure safe, effective, and patient-centered prosthetic care.

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