Rationale for Removal of Dental Amalgam Restoration in a Patient with Systemic Lupus Erythematosus: A Case-Based Perspective

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ABSTRACT

Systemic lupus erythematosus (SLE) is a chronic autoimmune disease characterized by immune dysregulation and a high prevalence of oral and perioral manifestations that may complicate dental management. Although dental amalgam remains a safe and durable restorative material for the general population, its mercury content and immunomodulatory properties raise specific considerations in patients with underlying autoimmune disease. This case-based manuscript examines the scientific and clinical rationale for removal of dental amalgam restorations in a patient with SLE, with particular emphasis on immune susceptibility, oral mucosal findings, and evidence derived from hypersensitivity and autoimmune literature. Current epidemiologic data do not support a causal relationship between dental amalgam exposure and the development of SLE; however, selected patients may exhibit heightened immune responsiveness or localized oral reactions that warrant individualized clinical intervention. By integrating existing evidence with common oral examination findings, this report provides a balanced, evidence-based framework for clinicians considering amalgam removal as an adjunctive strategy in the dental management of patients with SLE.

Keywords: systemic lupus erythematosus; dental amalgam; mercury hypersensitivity; oral manifestations; autoimmune disease; case report

INTRODUCTION AND CLINICAL CONTEXT

Systemic lupus erythematosus (SLE) is a chronic, multisystem autoimmune disorder characterized by loss of immune tolerance, autoantibody production, and immune-complex–mediated tissue injury [1,2]. The oral cavity is frequently involved, with manifestations including recurrent ulcerations, erosive or lichenoid mucosal lesions, xerostomia, glossodynia, dysgeusia, and periodontal inflammation. These findings often reflect underlying immune dysregulation rather than isolated local pathology [3–5]. Oral manifestations may fluctuate with systemic disease activity and can be exacerbated by environmental exposures or iatrogenic factors, underscoring the importance of dental material biocompatibility in the comprehensive management of patients with SLE [4,6].

Dental Amalgam and Immune Modulation

Dental amalgam restorations contain approximately 50% elemental mercury by weight. Mercury vapor is continuously released from the restoration surface, with inhalation representing the most clinically significant route of systemic absorption [7,8].

Regulatory bodies including the World Health Organization (WHO), the U.S. Food and Drug Administration (FDA), and the International Association for Dental Research (IADR) have concluded that dental amalgam is safe for the general population. Nevertheless, mercury is a biologically active metal with well-established immunomodulatory properties [8–10]. In patients with pre-existing autoimmune disease, chronic low-level mercury exposure may function as a nonspecific immune stimulus capable of amplifying ongoing inflammatory pathways rather than initiating disease de novo [10,11].

Hypersensitivity Reactions and Oral Immunopathology

Delayed-type (Type IV) hypersensitivity reactions to amalgam components are well documented in the dental literature and may present clinically as oral lichenoid contact lesions, chronic mucositis, or localized erythema in close anatomic proximity to restorations [12,13]. Histopathologic and immunologic investigations have demonstrated increased expression of pro-inflammatory mediators, including intercellular adhesion molecule-1 (ICAM-1) and chemokines such as RANTES (CCL5), in mucosal tissues exposed to amalgam [13]. In patients with SLE—whose mucosal tissues are already susceptible to immune-mediated injury—such hypersensitivity reactions may contribute to persistent oral inflammation that is clinically difficult to distinguish from lupus-related mucosal disease [3,5,14].

Evidence from Autoimmune Conditions and Amalgam Removal

Large population-based cohort studies have not demonstrated an increased incidence of SLE based on restorative material type, suggesting that dental amalgam is unlikely to serve as a primary etiologic factor in lupus development [15,16]. However, investigations in other autoimmune conditions provide evidence supporting patient-specific susceptibility. In individuals with autoimmune thyroiditis and documented mercury hypersensitivity, removal of amalgam restorations has been associated with statistically significant reductions in disease-specific autoantibody titers, whereas no comparable improvement was observed in patients whose amalgam restorations were retained [17]. These findings support a susceptibility-based model in which amalgam may act as a contributory immunologic trigger in selected patients rather than a universal risk factor [11,17].

Common Oral Examination Findings in Patients with SLE

Patients with SLE frequently exhibit characteristic oral findings on clinical examination. Common manifestations include recurrent aphthous-like ulcerations, palatal or buccal mucosal erythema, lichenoid plaque-like lesions, angular cheilitis, generalized gingival inflammation, increased periodontal probing depths, and signs of xerostomia or hyposalivation [3–6,18]. Secondary Sjögren's syndrome may further contribute to increased caries risk, mucosal fragility, and delayed wound healing. In addition, long-term corticosteroid or immunosuppressive therapy commonly employed in SLE management increases susceptibility to oral candidiasis and other opportunistic infections [4,6,18,19]. Identification of these findings is essential when evaluating potential local contributors to persistent mucosal disease, including restorative materials.

Clinical Rationale for Amalgam Removal in the Present Case

In the context of SLE, consideration of dental amalgam removal may be appropriate when persistent oral lesions are anatomically associated with existing restorations, when hypersensitivity reactions are suspected, or when minimization of potential inflammatory confounders is clinically justified. Current professional consensus discourages routine or prophylactic removal of clinically acceptable amalgam restorations; however, it also emphasizes individualized risk–benefit assessment in patients with documented adverse reactions or autoimmune disease [9,10]. In such cases, removal is undertaken as a localized intervention aimed at reducing mucosal immune stimulation rather than as a therapeutic modality for systemic lupus itself. This was cross checked as a recommendation from the patient's treating physician.

CONCLUSION

Although dental amalgam remains a safe and effective restorative material for the general population, its immunomodulatory properties warrant careful consideration in patients with systemic autoimmune disease such as SLE. Existing evidence does not support a causal role for amalgam in lupus pathogenesis; however, in selected patients with persistent mucosal manifestations or suspected hypersensitivity, amalgam removal may represent a reasonable adjunctive strategy to reduce localized inflammatory burden. Carefully documented case reports provide valuable clinical insight into individualized dental management in autoimmune disease while maintaining adherence to evidence-based practice principles.

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