



## Amalgam Tattoo in Atypical Localization at the Buccal Mucosa: Case Report

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### Abstract

Several lesions may manifest themselves clinically in the mucosa of the oral cavity, preceding skin lesions, among them the melanoma. Diagnosis is essential to eliminate possible misunderstandings and elucidate the nature of the lesions. Amalgam tattoo is constituted by the deposition of metallic ions, particularly silver, copper and tin, resulting from residues of amalgam restorations. It is characterized clinically by a darkened macula, which may or not present radiographically as a radiopaque image. The clinical differential diagnosis includes melanoma, melanin pigmentation, nevus, hemangioma and melanoacanthosis. Diagnosis is based on clinical and radiographic features, and histopathological examination is conclusive. Most of the time, it does not require treatment. However, histopathological diagnosis after biopsy can help the dental surgeon to elucidate the case. The purpose of this article is to present a case of amalgam tattoo in an atypical location (buccal mucosa), which was elucidated by histopathology. The clinical, radiographic and histopathological characteristics, etiopathogenesis, differential diagnosis and therapeutic modalities, when necessary, were discussed.

**Keywords:** Dental Amalgam; Amalgam Tattoo; Oral Pathology; Adverse Effects; Skin Manifestations; Oral Diagnosis

### Introduction

Several skin lesions can manifest themselves on the mucosa of the oral cavity. Frequently they can be observed initially in this mucosa, preceding the systemic manifestation. Otherwise, amalgam tattoo is a lesion frequently found in dental practice. It usually presents typical clinical and radiographic features, although the latter are not always present [1-4,6-8,10-16]. However, the diagnosis is elucidated by histopathological examination. This lesion can be found in the gingiva or alveolar ridge near teeth restored with amalgam or in edentulous areas with a history of amalgam restorations in adjacent teeth or teeth that have undergone retrograde filling with amalgam, being generally asymptomatic [8,10,15,16]. Recently, amalgam tattoo was classified by Consensus Report of the 2017 World Workshop

on the Classification of Periodontal and Peri-Implant Diseases and Conditions as gingival diseases - non-dental plaque -induced, gingival pigmentation (item 3, H, iv) [17].

In 2018, Tavares, *et al.* [18] reviewed 458 pigmented lesions of the oral cavity over 64 years (1952 - 2016), of which 212 cases (46.3%) were diagnosed as amalgam tattoo. More recently, a retrospective review of two oral pathology services in Brazil, evaluated 77,074 diagnosed lesions over 45 years (1974 - 2019). Of these, 761 (0.99%) represented pigmented lesions of the oral mucosa, among which 408 (0.52%) were amalgam tattoo [9].

Amalgam tattoo occurs by the impregnation of metal ion pigments into epithelial, connective, periosteal and bone tissues. There is no predilection for race, age, or gender, as it is an

incidentally occurring lesion in dental procedures [2,6,10,15,16]. The clinical importance is due to the wide range in differential diagnosis. Thus, the diagnosis is important for the tranquility, both for the patient and the professional.

### Purpose of the Study

The purpose of this article was to present a case of amalgam tattoo in an atypical location on the buccal mucosa, which was only elucidated through histopathological examination.

### Case Report

A Caucasian female patient, 47-year-old, came to our private clinic complaining of a lesion in the mouth.

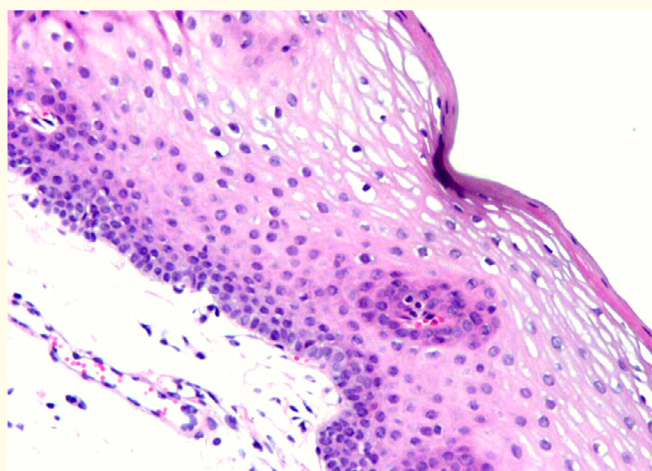
During intraoral clinical examination, the patient presented a single, blackish, asymptomatic macula with poorly defined borders, measuring approximately 5 mm in diameter, located on the buccal mucosa near the right trigono retromolar region (Figure 1). Regarding the systemic condition, the patient reported depression, being controlled by paroxetine hydrochloride 20 mg.



**Figure 1:** Blackened, diffuse staining macula in the buccal mucosa in the right trigono retromolar region.

Excisional biopsy was suggested. Under local anesthesia, the lesion was removed and the region was sutured. An analgesic drug was administered in the post-surgical phase.

The lesion was fixed in 10% formalin and sent to the Laboratory of Surgical Pathology of the School of Dentistry of the University of São Paulo. Histological sections revealed a fragment of mucosa covered by parakeratinized stratified pavement epithelium, showing acanthosis and hydropic degeneration. In the lamina propria, constituted by dense connective tissue, numerous fragments of exogenous material of dark brown color and reticular arrangement were observed scattered among the collagen fibers and in the perivascular region. The histopathological diagnosis was amalgam tattoo (Figure 2).



**Figure 2:** Histopathology of amalgam tattoo (Staining: HE; 20X magnification).

The patient evolved properly post-surgery, and the suture was removed after 7 days. The region healed satisfactorily. The patient was reassured of the harmless diagnosis and was oriented regarding the improbable recurrence.

### Discussion

Amalgam tattoo presents clinically as a dark spot or macula, bluish, black or brownish, with irregular, unclear or well-defined borders, usually single, although it can be multilocular; variable in size; asymptomatic. It is located in any region of the oral mucosa. However, it appears more frequently on the alveolar mucosa and gingiva, near teeth restored with amalgam or in edentulous areas with a history of amalgam restorations [1,3,6-8,10,13-16,19]. Slightly elevated macules have also been described [1,13].

Although amalgam tattoo presents typical radiographic features, difficulties in diagnosis can be encountered. Irregular, radiopaque particles characteristic of foreign bodies sometimes aid in diagnosis [1,2,12,13]. However in several cases, these particles are diffuse or too small to be observed. The radiographic image can be inconclusive when it is radiolucent, except when large fragments of amalgam are impregnated in the tissue. The need to elucidate the diagnosis requires biopsy and subsequent histological examination [1,7,15,19]. Adjunct radiographic evaluation is indicated, checking for dispersion and presence of amalgam pigments, but it is not always possible, as in the present case. The use of radiographs has been advocated in cases of the identification of cadavers (legal dentistry) [12].

Regarding histopathological characteristics, stained particles were observed as dark, fine, discrete, irregular and solid pigments in the stroma of the connective tissue, interposed between collagen and muscle fibers, nerve branches, blood vessels and acini of minor salivary glands. Epithelial tissue integrity has been observed. In some cases, they can reach bone tissue. The inflammatory reaction was variable [1-3,6,7,10,13,16,20,21]. There is a possibility of granuloma formation [13]. Granules were also found inside cells such as histiocytes, macrophages, endothelial cells, multinucleated giant cells and fibroblasts [1,21].

Regarding etiopathogenesis, amalgam tattoo occurs by the introduction, deposition and corrosion of the ions responsible for the gamma 2 phase of conventional amalgams in soft tissue, during restorative (condensation of amalgam during restorations or removal of old restorations with rotary instruments) or surgical procedures (amalgam fragments that can be introduced into the alveolus or under the periosteum during exodontia or retrograde surgery) [1-4,6,7,10,13,14,16,21]. The lesion may have its size increased as a result of the activity of giant cells, macrophages and possibly by tissue fluids, which were slowly able to hold and break down the amalgam fragments [1,2].

Among the lesions that can affect the oral cavity mucosa, can be highlighted specific pigmentation in syndromes (Addison's, Peutz-Jeghers, Albrights), dermatological alterations and lesions (racial pigmentation, melanoacanthosis, chloroquine pigmentation,

heavy metal pigmentation, simple and compound pigmented nevus), vascular (hematomas, varicose veins and hemangiomas) and neoplastic (melanoma, Kaposi's Sarcoma) [1-10,16]. In the clinical case presented, the clinical and radiographic features were not sufficient to conclude the diagnosis, and it was elucidated only through histopathological examination.

Amalgam tattoo does not require treatment, nor does it pose any health risk. Despite its asymptomatic nature, amalgam tattoo has been associated with burning mouth syndrome and lichen planus, requiring removal [8]. Additionally, the aesthetic complaint, especially in patients with gummy smile, or in cases of concern of the patient or the dental surgeon, an excisional or incisional biopsy is indicated. If the excisional biopsy is chosen, it is curative [1-3,10,13,15,19,21]. Weaver, *et al.* (1997) reported a lesion diagnosed by histopathological examination as amalgam tattoo, being related to headache, orofacial pain, sinusitis and TMD, in a female patient. After the surgical treatment it was verified the improvement of the symptoms [13]. Due to the aesthetic need, some alternative treatments have been reported, such as the use of mucogingival reconstructive surgery, particularly by the technique of free gingival graft, connective tissue graft, use of acellular dermal matrix, electrosurgery, cryosurgery, radiosurgery and mucoabrasion taking care to curet the bone pigmented by the amalgam [8,10,11,14,16,21]. Recently, Mathews (2020) considered bone removal unnecessary, determining only grafting with thick epithelial tissue [15]. The alexandrite (755 nm) and ruby (694 nm) lasers were used in pigmentation ablation, with the former showing a better result compared to ruby. Gingivoplasty (gingival pilling) was cited as an alternative therapeutic procedure [6,14,16].

## Conclusion

Amalgam tattoo is a lesion frequently found in dental clinic, presenting typical radiographic and clinical features. However, radiographic features are not always observed. The elucidation of the diagnosis occurs by histopathological examination, due to the amplitude of the clinical differential diagnosis. The histopathological diagnosis and treatment when needed are important to reassure the patient as well as the dental surgeon. However, the frequency of amalgam tattoo tends to decrease, since the use of amalgam is in disuse and other esthetic restorative materials are in vogue.

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