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Diagnostic challenges in odontoma-induced pathological migration in periodontitis patient – a case report with 4-year post-operative outcome

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ABSTRACT

Background. Odontomas are common odontogenic tumors, considered as developmental malformations rather than true neoplasms. They are typically detected during routine radiographic investigations and are composed of tissues resembling enamel, dentin, cementum, and pulp.

Case presentation. This report describes a case of a compound odontoma in the anterior maxilla of a 43-year-old female with chronic periodontitis. Initially, the spacing in the anterior teeth was attributed to pathological migration due to periodontitis. However, radiographs revealed a radiopaque mass between the left maxillary central and lateral incisors, identified as an odontoma. Odontomas are known to cause tooth malposition, diastema, and ectopic eruption, which explains the spacing observed in this case. The lesion was surgically treated using a full-thickness papilla preservation flap, and the resulting osseous defect was reconstructed. Four years of follow-up demonstrated a stable periodontium.

Conclusion. This case highlights the importance of comprehensive history-taking, precise radiographic interpretation, and considering unerupted odontomas or supernumerary teeth in cases of spacing associated with periodontitis.

Keywords: compound odontome, chronic periodontitis, dental radiography, diastema, tooth migration

INTRODUCTION

Odontomas, accounting for 22% of odontogenic tumors in the jaws, are known for their non-aggressive nature [1]. Reports have also suggested a prevalence of approximately 35-76% and an incidence in the range of 19.3-41.5%, demonstrating variation across populations [2]. A study in the Indian population, however, showed a relatively small figure of only 4.9%, suggesting that odontomes represented the third most common type of odontogenic tumor, with ameloblastomas being the most common and keratocystic odontogenic tumors the second most common. They are mineralized hamartomatous malformations of ectodermal and mesodermal cellular origin, classified into complex and compound types based on the type and spatial arrangement of the dental tissues [3-5]. While compound odontomes histologically present as small, organized tooth-like structures, complex odontomas appear as a disorganized aggregate of all dental tissues. Compound odontomas are usually composed of multiple minuscule denticles embedded in fibrous connective tissue surrounded by a fibrous capsule [6].

These lesions occur mainly in the anterior maxilla, either on the crowns of unerupted teeth or between the roots of erupted teeth [7]. While compound odontomas are frequently encountered in

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the anterior region of the maxilla, complex odontomas are typically found in the posterior region of the mandible [8]. The statistics on the gender predilection of these lesions are conflicting in the literature, ranging from no difference to a minimal difference between genders. However, some literature suggests a female predilection [9,10].

Odontomas are most frequently observed in individuals during their second or third decades of life, although cases have been reported in patients aged between 3 and 71 years [11]. These developmental anomalies usually present as asymptomatic intraosseous lesions that exhibit passive growth and rarely exceed the size of a tooth structure. In some cases, an increase in size can cause the cortical bone to expand. The main mode of management is complete surgical excision, which offers a favorable prognosis [12].

In this report, we present a rare case of a compound composite odontoma associated with chronic periodontitis in the anterior maxilla. The patient's primary complaint of an anterior diastema was initially considered, during the provisional diagnostic phase, as pathological tooth migration or drifting, a common sequel of periodontitis. The patient reported that the diastema had been present since the eruption of the permanent teeth, but had widened over the past year. Radiographic examination revealed a radiopaque mass, which was surgically accessed during periodontal flap surgery. Subsequent histopathological examination of the excised tissue mass revealed an intraosseous compound composite odontoma. The patient was followed up annually for four years, during which the periodontal tissues remained stable.

CASE REPORT

A 43-year-old female patient presented to the Department of Periodontics with the complaint of "spacing in upper front teeth." She reported that the spacing had been present for as long as she could remember. However, her concern was an increase in the spacing in the anterior maxillary region over the past year. Hence, she wished to prevent further progression.

Dental history revealed that she was not a regular dental attendee and had no history of complex dental treatment. Nevertheless, she had undergone dental cleaning, restorations approximately 5 years earlier, and extractions of upper and lower posterior teeth 20 years earlier due to dental caries. Her oral hygiene history revealed that she brushed her teeth once daily in the morning using a manual toothbrush and toothpaste, without any adjunctive use of oral hygiene aids. She reported being medically fit and well and did not report any adverse habits. Her family history was also unremarkable.

On clinical examination of the maxillary anterior region, open contacts were present between the maxillary incisors. Between the left central and lateral incisor, the spacing was approximately 3 mm. Additionally, missing mandibular second molars, a moderate amount of plaque and calculus, incisal wear in the mandibular anterior teeth, and dental caries in the maxillary left first premolar and first molar were also observed and recorded.

On gingival examination, the gingivae were pale pink and firm in consistency (Figure 1a), with bleeding on probing in the posterior teeth. Periodontal examination revealed generalized probing depths of 5 to 7 mm, grade 1 mobility in mandibular incisors, Miller Class 3 gingival recession in mandibular incisors, and Grade 2 cul-de-sac furcation involvement in the mandibular right first molar. Thus, according to the 1999 AAP classification, a provisional diagnosis of generalized moderate chronic periodontitis was made [13]. According to the 2017 classification of periodontal and peri-implant diseases and conditions, a diagnosis of periodontitis stage III and grade B was made based of the following periodontal parameters: interdental clinical attachment level was 3-4 mm at the site of greatest loss, the bone loss extended till the coronal third, there was no reported tooth loss due to periodontitis and the probing depths were ≥5 mm, there was mostly horizontal tooth loss and the periodontal destruction was commensurate with the biofilm present [14].

Radiographic examination revealed a radiopaque mass extending obliquely between the roots of the maxillary left central and lateral incisor (Figure 1b). In addition, generalized horizontal bone loss extending to the coronal third of teeth was noted (Figure 1c). A differential diagnosis of an impacted supernumerary tooth versus an odontoma was considered. Areas of horizontal and vertical bone loss were also present, along with furcation involvement in the mandibular right molar region.

A treatment plan was established based on the patient's chief concern and clinical findings. Informed consent was obtained before initiating treatment. Initial therapy included assessment of plaque scores, oral hygiene instructions, dietary advice, and professional mechanical plaque removal (PMPR) on both supra- and subgingival root surfaces, along with stabilization of dental caries. At the 3-month review, the patient demonstrated acceptable plaque scores. However, sites with persistent probing pocket depths and bleeding remained. Therefore, access flap surgery with regenerative procedures was performed at the relevant sites 6 months after completion of initial therapy.

In the maxillary anterior region, a full-thickness papilla preservation flap was elevated under local anesthesia using 2% lignocaine hydrochloride with

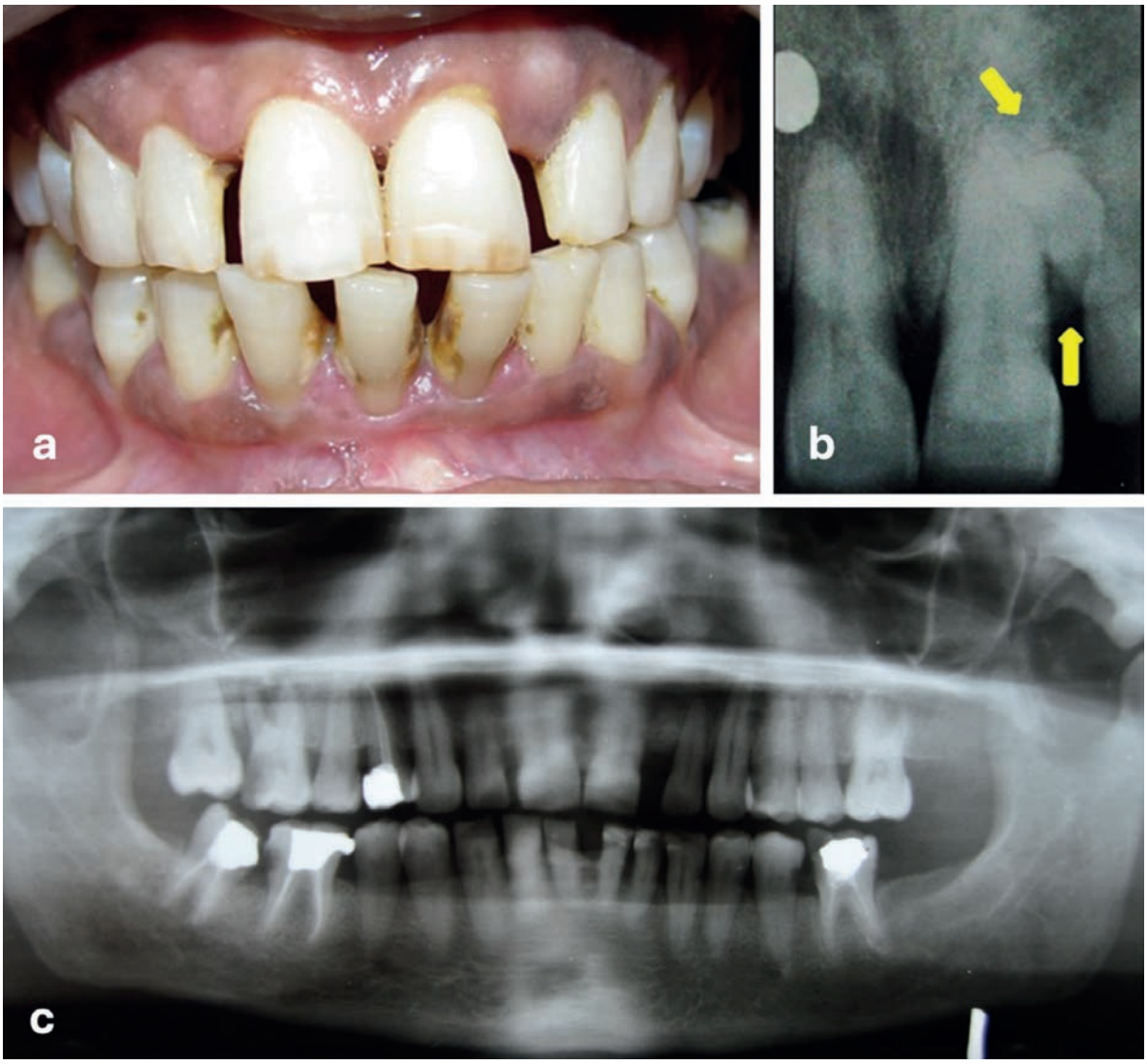


FIGURE 1. a. Pre-operative frontal view showing spacing in the anterior region; b. Pre-operative IOPA radiograph showing an irregular radiopaque mass between 21 and 22

adrenaline at a concentration of 1:80,000. Two small tooth-like structures (denticles) were revealed after flap elevation, consistent with the radiopaque mass seen on the periapical radiograph (Figure 2a). Thorough mechanical debridement was performed, and the small denticles present between the maxillary left central and lateral incisor were removed and sent for histopathological examination (Figure 2b). The denticles measured approximately 0.6 × 1 cm and 0.4 × 0.8 cm and resembled miniature tooth structures. The contained osseous defects left following removal of the odontoma were reconstructed with Sybograf TM (Eucare Pharmaceuticals Private Limited) (Figure 2c), and the surgical site was approximated with 4-0 Vicryl cross-mattress suture (Figure 2d). Postoperative healing was uneventful.

Histopathological examination of the decalcified specimen showed a tooth-like structure with a crown and root. Mature dentin was present in both the crown and root portions, with collagen fibers and blood vessels centrally, consistent with pulp tissue. In addition, the peripheral aspect of the root showed cementum-like material (Figure 3a, 3b).

The patient was placed on supportive periodontal therapy every 3 months during the first year and annually thereafter. At the 4-year clinical and radiographic review, the periodontium remained stable, with no further progression of spacing (Figure 4a), no recurrence of the lesion, and radiographic evidence of bone fill (Figure 4b).

DISCUSSION

The etiology of odontomas is largely unknown, but it has been linked to various pathological factors, including local trauma, infection, inflammation, genetic anomalies, or alterations in the genetic components that regulate tooth development [15].

In the present case report, given the uncommon occurrence of a compound odontome in a patient

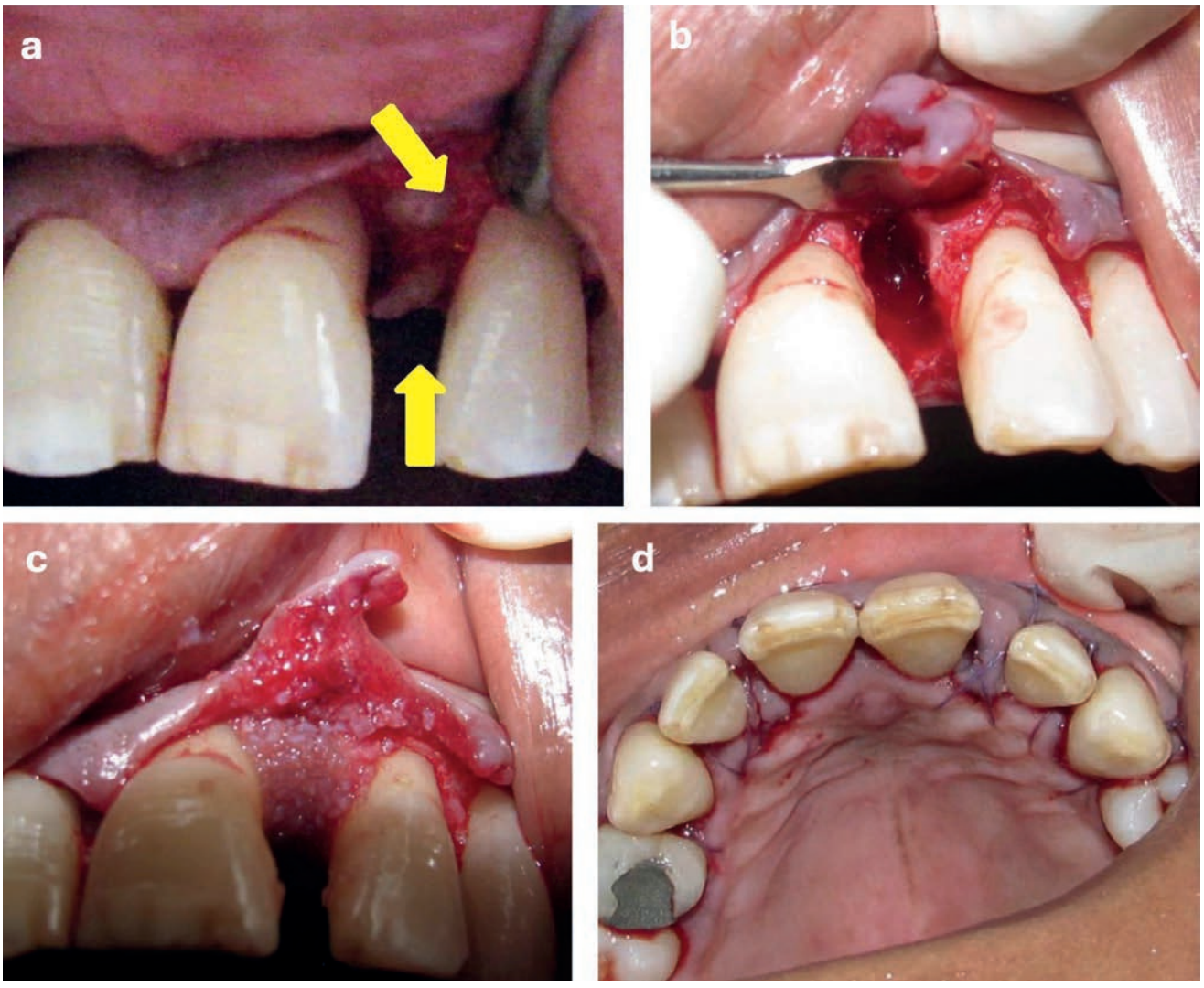


FIGURE 2. a. Elevation of papilla preservation flap showing two tiny tooth like structures between 21 and 22; b. Self-contained defects, after the removal of toothlike structures between 21 and 22; c. Placement of bone replacement graft in the defect; d. Placement of 4-0, vicryl sutures; Note-cross mattress suture between 21 and 22

with periodontitis, the radiopaque lesions was identified only upon radiographic examination, which heightened clinical suspicion. Ultimately, the pathological spacing was attributed to the presence of odontoma, with periodontitis further exacerbating the condition.

Asymptomatic odontomas cannot usually be identified clinically unless they become secondarily infected. Although the treatment of a compound odontoma typically involves only surgical removal, in this patient the concomitant periodontal management allowed elevation of a papilla preservation flap, which is particularly appropriate in the maxillary anterior region, along with regeneration using bone grafts [16]. Since it was a self-contained defect, placement of a barrier membrane was not required. The treatment outcome was satisfactory at the 4-year review, with stable periodontal health, as evidenced by the absence of bleeding on probing and the patient's continued efforts to maintain acceptable of plaque control.

The bone graft used in this procedure was a synthetic nanocrystalline hydroxyapatite, chosen based on scientific evidence, affordability, and availability. This biomaterial differs from microcrystalline hydroxyapatite in terms of its solubility and chemical composition, which more closely correspond to natural bone mineral. Additionally, complete resorption of nanocrystalline hydroxyapatite has been recorded to occur in approximately 12 weeks, in contrast to microcrystalline hydroxyapatite, which resorbs more slowly [17].

In the present case, however, the 4-year review demonstrated evidence of bone fill with a fine radiolucent line surrounding the grafted area. It has been previously demonstrated that as the odontoma increases in size, it may cause the sequestration of the overlying bone, leading to occlusal movement or eruption. The increase in size may also produce sufficient force sufficient to cause alveolar bone resorption. In addition, it has been suggested that the presence of granulation tissue within the perio-

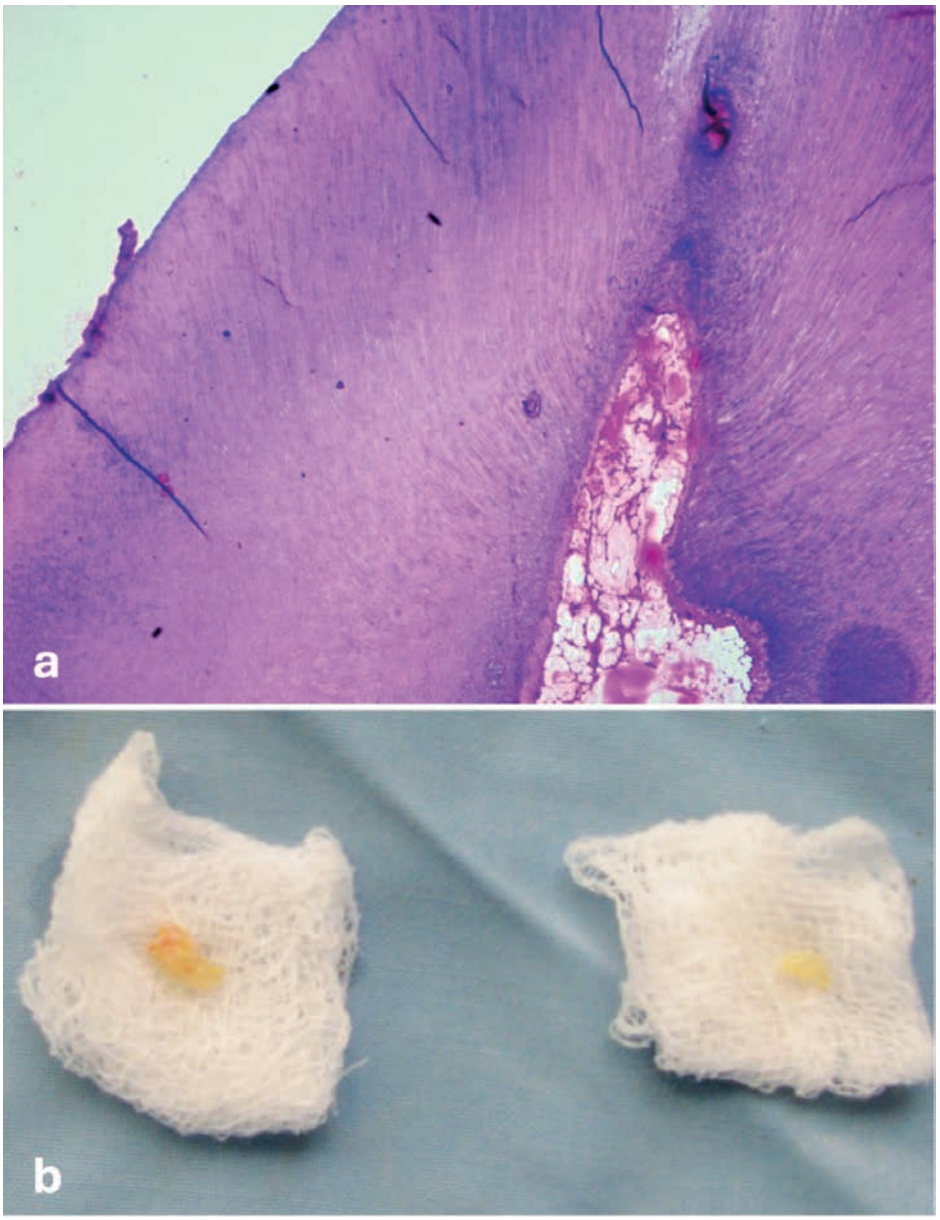


FIGURE 3. a. Histopathological section showing dentine, pulp and cementum like material suggestive of compound composite odontoma; b. Extracted specimens sent for histopathological examination



FIGURE 4. a. Post-operative review at 4 years showing stable periodontium; b. IOPA radiograph showing evidence of bone fill; c. OPG showing a stable periodontium

dontal pocket, together with secondary abnormal occlusal forces, may have partially contributed to the spacing observed in the maxillary anterior region [18].

The four-year postoperative follow-up revealed sustained positive outcomes following regenerative periodontal management. The patient underwent supportive periodontal therapy with regular professional evaluations to prevent the recurrence of periodontal pockets. Fortunately, the patient consistently maintained acceptable oral hygiene, and no further deterioration of the periodontium was observed.

CONCLUSION

The clinical characteristics of the present case could have led to the assumption that the etiology of the spacing was chronic periodontitis if the radiographic findings had not been carefully interpreted. Hence, careful evaluation of all factors contributing to spacing, including the possibility of hidden calcified masses, is warranted even in cases of obvious periodontitis. This case report emphasizes the importance of considering additional etiological factors for spacing in patients with chronic periodontitis rather than attributing it solely to pathological tooth migration.

Conflict of interest

The authors declare no conflict of interest.

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