

Odontoma Associated with an Impacted Maxillary Central Incisor: A Case Report

Shabnam Milani ¹, Mehdi Shahrabi ², Zohre Sadat Hosseinpour ^{✉3}

¹ Assistant Professor, Department of Pediatric Dentistry, Faculty of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

² Associate Professor, Department of Pediatric Dentistry, Faculty of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

³ Assistant Professor, Department of Pediatric Dentistry, Faculty of Dentistry, AJA University of Medical Sciences, Tehran, Iran

Abstract

Introduction: Odontomas are the most common type of odontogenic tumors of the oral cavity and are described as one of the contributing factors to tooth impaction. The impaction of the maxillary incisors causes several esthetic and functional problems. A multidisciplinary approach is required for proper planning, surgical procedure, and orthodontic traction of the impacted tooth.

Case Presentation: The aim of this case report is to present a clinical case of a 10-year-old female patient with the chief compliant of absence of the upper right permanent central incisor. Radiographic examination revealed that over-retention of the right central incisor was associated with a mixed lesion showing tooth-like structures. The lesion, which was characterized as compound odontoma, was surgically removed. Because of the deep position of the impacted tooth, surgical exposure and orthodontic traction were planned after 10 months of watchful waiting.

Results: Combined surgical and orthodontic treatments are recommended for impacted maxillary central incisors associated with odontoma.

Key Words: Orthodontic Extrusion; Tooth, Impacted; odontoma; Incisor

✉ Corresponding author:
Zohre Sadat Hosseinpour,
Assistant Professor,
Department of Pediatric
Dentistry, Faculty of Dentistry,
AJA University of Medical
Sciences, Tehran, Iran

zohreshosseinpour@gmail.com

Received: 16 June 2021
Accepted: 26 Nov 2021

- **Cite this article as:** Milani Sh, Shahrabi M, Hosseinpour Z. Odontoma Associated with an Impacted Maxillary Central Incisor: A Case Report. J Iran Dent Assoc. 2022; 34(1-2):36-41. doi: [10.34172/jida.A-10-1-980](https://doi.org/10.34172/jida.A-10-1-980)

Introduction

Although the prevalence of maxillary central incisor impaction is low (0.06% to 0.20%) (1), its occurrence poses a disturbing esthetic dilemma for parents. Some etiological factors may justify the retention and/or impaction of the teeth such as lack of space in the dental arch, traumatic and genetic factors, inflammatory and pathologic processes within the bone, and consequences of systemic

diseases (2). Presence of odontoma in the maxilla associated with impacted teeth is a complicated situation. Odontomas are the most common odontogenic tumors (30-40% of all lesions), which are composed of epithelial and mesenchymal tissues which primarily present as enamel and dentin when fully formed (3). According to the World Health Organization, odontomas are classified into two main types of complex and compound. Compound odontomas

are about twice as common as the complex type, and occur most often in the anterior maxilla and have numerous tooth-like structures (denticles) (4). The etiology of odontoma is unknown, but some associations have been suspected with trauma to the deciduous teeth, inflammatory and infectious processes, hereditary anomalies, and genetic mutations (5, 6). As odontomas are asymptomatic, they are discovered on routine radiographs and can cause tooth eruption disturbances and intrabony defects (7). Radiographically, odontomas present as a well-defined radiopacity with multiple small calcified (tooth-like) structures surrounded by a lucent zone (8). This study aimed to present the treatment (surgical and orthodontic) of a compound odontoma associated with an impacted maxillary central incisor.

Case Presentation

A 10-year-old female patient presented to the Department of Pediatric Dentistry, Faculty of Dentistry at Tehran University of Medical Sciences, Tehran, Iran, with the chief compliant of absence of the upper right permanent central incisor. Her personal and familial medical history was non-contributory. Neither the patient nor her parents reported any history of pain or trauma to the anterior maxilla. On clinical intraoral examination (Figure 1a), the patient had a mixed dentition with a missing right central incisor. The right lateral incisor had tilted into the open space, and she had anterior and posterior cross bite.

Panoramic radiography (Figure 1b) revealed impaction of permanent maxillary right central incisor and an oval structure with radiolucent borders filled with a mass of small calcified structures, probably corresponding to a compound odontoma. Cone-beam computed tomography was requested to assess the precise location of the impacted tooth and the extent of the lesion, as well as its relations to the surrounding anatomical structures (Figure 1c). Cone-beam computed tomography showed that the maxillary right central incisor was right below the nasal floor with its palatal surface facing the maxillary midline. On the basis of clinical and radiographic findings, a preliminary

diagnosis of compound odontoma associated with impacted tooth was made. Removal of the odontoma and orthodontic treatment for correction of malocclusion (maxillary expansion and space regaining for the impacted maxillary incisor) was recommended and scheduled.

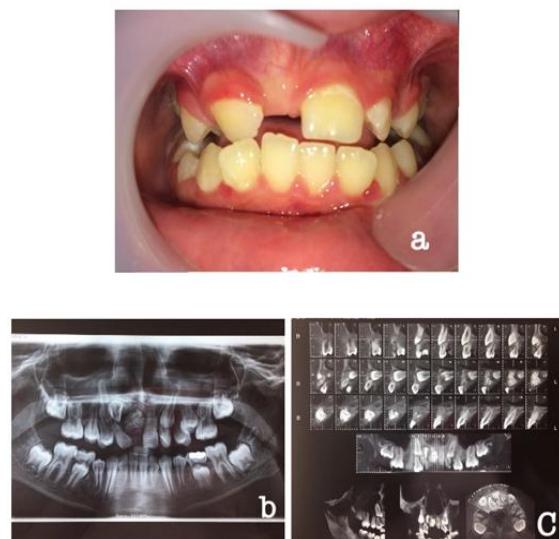


Figure 1. (a) Pretreatment intraoral view; (b) pretreatment panoramic radiograph showing impaction of permanent maxillary right central incisor and an oval structure with radiolucent borders; (c) Cone beam computed tomography reveals the precise location of the impacted tooth and the extent of the lesion

Because of the deep position of the impacted tooth, a two-stage surgical treatment plan was designed and in the first stage, the odontoma was totally enucleated through an intraoral approach (Figures 2a and 2b) under local anesthesia and the surgical site was sutured. As the lesion contained numerous tooth-like structures, the preliminary diagnosis was confirmed (Figure 2c). One week after the surgery, a removable appliance was used to correct the maxillary constriction and regain space in the anterior maxilla to facilitate the eruption of the impacted tooth. The palatal screw was activated every week by the patient and the finger spring was activated by the clinician every month.

Treatment included careful observation and watchful waiting by periapical radiography to assess the location of the impacted tooth. The tooth position improved within 10 months.



Figure 2. (a and b), Flap elevation and excision of the lesion; (c), numerous tooth-like structures

However, as no change was apparent in the last two consecutive assessments (Figures 3a-c), surgical exposure and orthodontic traction were planned.

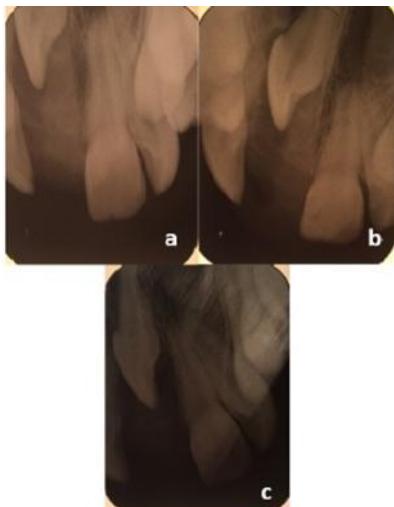


Figure 3. (a and b) Tooth position improved within 10 months; (b and c) no change was apparent in the last two radiographic examinations

To expose the impacted incisor, a mucoperiosteal flap was raised and sufficient amount of bone was removed with a round bur under local anesthesia. Inadequate isolation and accessibility in the operative field prevented

bonding of orthodontic attachment to the labial surface of the tooth.

A small hole was created near the incisal edge (far enough incisally to prevent pulpal damage and far enough cervically to avoid fracture of enamel) and 0.010-inch ligature wire was tightly ligated through the hole and exited the wound through the incision to apply orthodontic traction (Figure 4a-c).

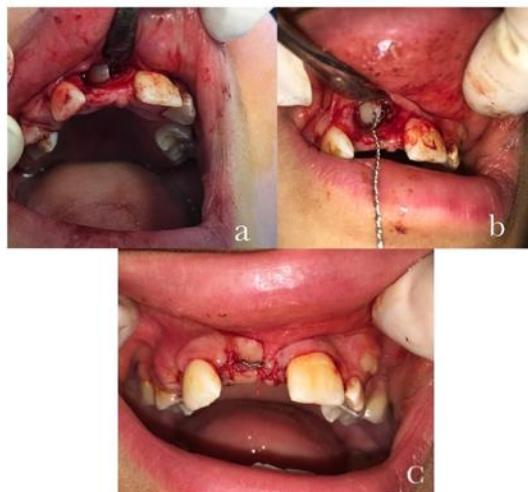


Figure 4. (a, b and c) Surgical exposure; ligature wire was tightly ligated through the hole and exited the wound through the incision

After one week, a new Hawley type appliance with a palatal hook was delivered to the patient and a medium 3/16 elastic was tied from the twisted wire to the palatal hook. The patient was instructed to replace the elastic with a new one every day. When the labial surface exposed to the mouth, the ligature was cut and the hole was restored with composite resin, and a bracket was bonded on the available labial surface to accomplish the alignment (Figure 5a). After 10 months, the tooth extruded enough but with almost 180-degree rotation (Figure 5b). A light elastic was used to correct the tooth rotation (Figure 5c) and a preapical radiograph was obtained (Figure 5d).

At 12 months, the patient was referred to the Orthodontics Department to undergo comprehensive orthodontic treatment but the

parents were reluctant due to the long duration of treatment so the patient received simple fixed appliance orthodontic therapy to further align the tooth into the arch (Figures 6a and b).



Figure 5. (a) Labial surface of the tooth was exposed and a bracket was bonded to finish its alignment; (b) after 10 months, the tooth extruded enough but with almost 180-degree rotation, (c) which was corrected using a light elastic; (d) periapical radiograph showing the fully erupted permanent right central incisor

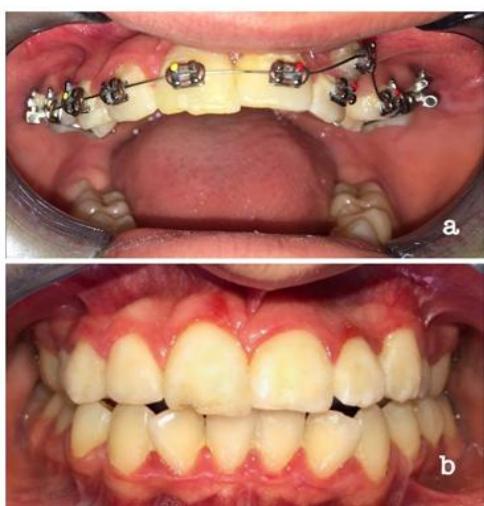


Figure 6. (a) Installation of fixed appliance; (b) intraoral photographs after 2 months of using the NiTi wire

Discussion

Herein, we reported a case of compound odontoma which disturbed the eruption of permanent incisor and caused an esthetic problem for the patient and her parents.

Most of the compound odontomas are found at the site of maxillary incisors and canines, and complex odontomas are more often located at the site of the second and third mandibular molars (9).

Although the prognosis of spontaneous eruption of impacted teeth associated with an odontoma has been reported to be good, the general recommendation is the excision of the tumor (10).

To determine whether successful tooth alignment can occur, the following factors must be considered: (I) tooth position and direction, (II) degree of root completion and (III) the available space in the dental arch (11). These factors were considered before designing the treatment plan for this case. Previous studies reported that impacted teeth can be brought to proper alignment in the dental arch by orthodontic traction (12-14). Because of high position of the tooth and difficulty in bonding of the attachments, spontaneous tooth eruption was considered. After removal of the odontoma, the tooth position and direction improved occlusally for 10 months but after that as no improvement was apparent in periodic radiographic examination for 4 months, surgical exposure was planned. As suggested by Vermette et al, (15) the closed-eruption surgical technique was used which induces natural tooth eruption. After surgical exposure of the crown, because of location and direction of the impacted tooth, it was impossible to isolate the field for bonding a button or bracket. To overcome this limitation, a hole was drilled in the incisal edge (16-18).

Shi et al. (19) indicated several advantages of the closed eruption technique as the best treatment option for impacted maxillary incisors, which included absence of discomfort, development of a proper gingival contour, no wound infection, and no need for a longer treatment. Another study observed no signs of root resorption or periapical radiolucency after execution of this technique in 30 patients.

The contours of the alveolar bone crests presented a U shape on the lingual and labial sides without dehiscence or fenestration (20).

A reddish, non-keratinized gingival collar appeared around the erupted tooth (Figure 7b), which may be related to the long span of eruption that was necessary. The free gingival tissue that appears after substantial orthodontic tooth extrusion originates from the sulcular non-keratinized epithelium (21).

Above all, it is recommended to properly inform the patients and the parents or guardians about the possibility of failure before engagement of the patient in the treatment procedure (22)

Conclusion

Treatment of impacted teeth is a challenge for clinicians. Accurate assessment of the impacted tooth position and the available space in the arch are necessary for treatment plan. Combined surgical and orthodontic treatments are recommended for the treatment of impacted maxillary central incisors associated with odontoma.

References

1. Cangialosi TJ. Management of a maxillary central incisor impacted by a supernumerary tooth. *J Am Dent Assoc.* 1982 Nov;105(5):812-4.
2. Karolak D, Lange J. Interdisciplinary (surgical and orthodontic) treatment in a patient with compound odontoma associated with impacted permanent lateral incisor of the mandible. *Nowa Stomatologia.* 2018 Mar 1.
3. Moore WE, Stephens A, Wilson T, Wilson W, Eichner JE. Peer reviewed: body mass index and blood pressure screening in a rural public school system: the Healthy Kids Project. *Prev Chronic Dis.* 2006 Oct;3(4):A114.
4. El-Naggar AK. WHO classification of head and neck tumours: International Agency for Research on Cancer(IARC); 2017.
5. Pippi R. Odontomas and supernumerary teeth: is there a common origin? *Int J Med Sci.* 2014 Nov 12;11(12):1282-97.
6. Kämmerer PW, Schneider D, Schiegnitz E, Schneider S, Walter C, Frerich B, et al. Clinical parameter of odontoma with special emphasis on treatment of impacted teeth—a retrospective multicentre study and literature review. *Clin Oral Investig.* 2016 Sep; 20(7): 1827-35.
7. Lo Giudice G, Lo Giudice R, Matarese G, Isola G, Cicciù M, Terranova A, et al. Evaluation of magnification systems in restorative dentistry. An in-vitro study. *Dental Cadmos.* 2015; 83(5): 296-305.
8. Pillai A, Moghe S, Gupta MK, Pathak A. A complex odontoma of the anterior maxilla associated with an erupting canine. *BMJ Case Rep.* 2013 Nov 12;2013: bcr2013200684.
9. Yıldırım-Öz G, Tosun G, Kızılığlu D, Durmuş E, Şener Y. An unusual association of odontomas with primary teeth. *Eur J Dent.* 2007 Jan;1(1): 45-9.
10. Troeltzsch M, Liedtke J, Troeltzsch V, Frankenberger R, Steiner T, Troeltzsch M. Odontoma-associated tooth impaction: accurate diagnosis with simple methods? Case report and literature review. *J Oral Maxillofac Surg.* 2012 Oct;70(10): e516-20.
11. Ashkenazi M, Greenberg BP, Chodik G, Rakocz M. Postoperative prognosis of unerupted teeth after removal of supernumerary teeth or odontomas. *Am J Orthod Dentofacial Orthop.* 2007;131(5):614-9.
12. Lin Y-TJ. Treatment of an impacted dilacerated maxillary central incisor. *Am J Orthod Dentofacial Orthop.* 1999 Apr; 115(4): 406-9.
13. Wasserstein A, Tzur B, Breznik N. Incomplete canine transposition and maxillary central incisor impaction—a case report. *Am J Orthod Dentofacial Orthop.* 1997 Jun;111(6): 635-9.
14. Tanaka E, Watanabe M, Nagaoka K, Yamaguchi K, Tanne K. Orthodontic traction of an impacted maxillary central incisor. *J Clin Orthod.* 2001 Jun;35(6):375-8.
15. Vermette ME, Kokich VG, Kennedy DB. Uncovering labially impacted teeth: apically positioned flap and closed-eruption techniques. *The Angle Orthod.* 1995 Feb 1;65(1):23-32.
16. Küchler EC, Tannure PN, Costa MD, Gleiser R. Management of an unerupted dilacerated maxillary central incisor after trauma to the Apr primary predecessor. *J Dent Child (Chic).* Jan-

2012;79(1):30-3.

17. Nguyen TP, Le Ngoc KN. Orthodontic and surgical treatment in an inverted maxillary impacted central incisor: A case report. *Dentistry*. 2017;7(452):2161-1122.

18. Soares TR, Alves TP, Monteiro LP, Braga DN, Gleiser R, de Araujo Castro GF. Management of an unerupted tooth and odontoma after trauma in predecessor. *Revista Científica do CRO-RJ*. 2020 Oct;5(1):58-63.

19. Shi XR, Hu Z, Wang XZ, Sun XY, Zhang CY, Si Y, et al. Evaluation of the effect of the closed-eruption technique on impacted immature maxillary incisors. *Chin J Dent Res*. 2015;18(2):111-5.

20. Shi X, Xie X, Quan J, Wang X, Sun X, Zhang C, et al. Evaluation of root and alveolar bone development of unilateral osseous impacted immature maxillary central incisors after the closed-eruption technique. *Am J Orthod Dentofacial Orthop*. 2015 Oct;148(4):587-98.

21. Mantzikos T, Shamus I. Forced eruption and implant site development: soft tissue response. *Am J Orthod Dentofacial Orthop*. 1997 Dec;112(6):596-606.

22. Brand A, Akhavan M, Tong H, Kooka Y, Zernik JH. Orthodontic, genetic, and periodontal considerations in the treatment of impacted maxillary central incisors: a study of twins. *Am J Orthod Dentofacial Orthop*. 2000 Jan;117(1):68-74.