International Journal of Dental Research and Allied Sciences
2025, Volume 5, Issue 1, Page No: 124-131

Available online at: www.tsdp.net

ISSN: 3062-3502

Case Report

Interdisciplinary Management of Large Odontomas in Growing Patients: Case Reports on Combined Surgical and Orthodontic Approaches

Rizzo Chiara[1], Moretti Andrea[1]*

[1]Department of Biomedical Surgical and Dental Sciences, University of Milan, Milan, Italy.

***E-mail** ✉ andreamoretti2025@outlook.com

Received: 14 March 2025; **Revised:** 06 June 2025; **Accepted:** 08 June 2025

ABSTRACT

Odontomas, the most common mixed odontogenic tumors, can obstruct the eruption of neighboring teeth and impair normal chewing function. The management of teeth impacted by odontomas largely depends on the tumor's location and the developmental stage of the affected tooth's root. This report highlights the clinical outcomes of combining surgical and orthodontic approaches in pediatric and adolescent patients with odontomas. Two patients—a boy aged 8 and a girl aged 17—were diagnosed with sizable odontomas in the posterior maxilla during radiographic evaluation. The tumors caused impaction of the first molars on the affected side in both cases.

Surgical excision of the odontomas was performed for both patients. In the younger patient, the impacted molar erupted naturally within fourteen months following surgery. In the older patient, orthodontic traction was required to achieve proper eruption and alignment of the impacted molar. Large posterior odontomas may result in malpositioned molars and altered root development. Early intervention before root maturation increases the likelihood of spontaneous tooth eruption; otherwise, orthodontic assistance becomes necessary. Coordinated care between surgical and orthodontic teams is crucial to ensure optimal outcomes in growing patients with odontomas.

Keywords: Odontoma, Hamartoma, Impacted tooth, Odontogenic tumor, Orthodontic traction, Spontaneous eruption

How to Cite This Article: Chiara R, Andrea M. Interdisciplinary Management of Large Odontomas in Growing Patients: Case Reports on Combined Surgical and Orthodontic Approaches. Int J Dent Res Allied Sci. 2025;5(1):124-31. https://doi.org/10.51847/iPHXEg3cvE

Introduction

Odontomas are developmental anomalies composed of both epithelial and mesenchymal dental tissues, forming tumor-like growths. Because of their slow growth, limited expansion, and well-organized tooth-like structure, they are generally regarded as hamartomas rather than true neoplasms [1–5]. Odontomas are classified according to their internal architecture: complex odontomas (OCxs) consist of irregular conglomerates of dentin, enamel, and cementum, whereas compound odontomas (OCps) form discrete, recognizable tooth-like structures ("odontoids") that may also contain pulp tissue. These formations display varying degrees of histological and morphological maturation and are enclosed within a fibrous connective tissue capsule [1–8].

According to the 2017 WHO classification of head and neck tumors, odontomas are the most frequently observed benign odontogenic lesions [5]. Nevertheless, their reported prevalence varies across populations, sometimes ranking second to ameloblastomas [9]. For instance, a large American study of 826 odontogenic tumors found that odontomas accounted for 75.9% of cases [3–5, 10–12], whereas a Turkish series reported a slightly lower frequency (27.2%), second only to ameloblastomas (29.7%) [13–15]. Such differences may reflect the often asymptomatic nature of odontomas, which are frequently detected incidentally during routine radiographs [9, 15].

Compound odontomas typically appear in the anterior maxilla (approximately 75% of cases), while complex odontomas are more commonly located in the posterior mandible (around 68%) [2, 5, 9, 13, 16]. They are usually discovered in adolescence, rarely involve primary teeth, and show no clear gender predilection. In many cases, odontomas interfere with the eruption of permanent teeth, leading to impaction, misalignment, or root malformation, which may cause malocclusion or esthetic concerns, particularly in the anterior region. Maxillary incisors and canines are most frequently affected, whereas mandibular molars are less commonly involved. Other less common manifestations include facial asymmetry, tooth agenesis, pain, or inflammation [2, 3, 13, 17].

Radiographically, compound odontomas are characterized by well-defined, tooth-like radiopaque structures, whereas complex odontomas may resemble other odontogenic lesions depending on their mineralization stage [13, 18]. Approximately 20% of calcifying odontogenic cysts (COCs) are associated with odontomas [19], making histopathological confirmation essential [9, 18, 20, 21].

The exact cause of odontomas remains unclear. Factors such as genetic syndromes (e.g., Gardner's syndrome) [5, 22], inflammatory processes, trauma to primary teeth, disturbances in odontoblast activity, or gene mutations affecting tooth development have been proposed [7, 11, 16, 17, 23–27].

Treatment generally involves complete surgical excision, including the fibrous capsule. When permanent teeth are impacted, orthodontic traction may be required to guide eruption. Early intervention, ideally before root formation is complete, can allow spontaneous eruption of affected teeth. In cases where safe removal is challenging due to proximity to adjacent teeth, extraction may be necessary [28, 29].

This report presents two cases of growing patients with odontomas treated through a combination of surgical removal and orthodontic management, highlighting the clinical outcomes of this interdisciplinary approach.

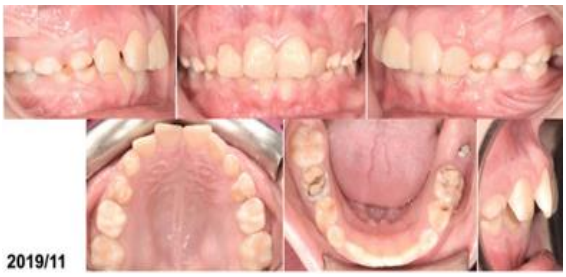
Case reports

Case 1

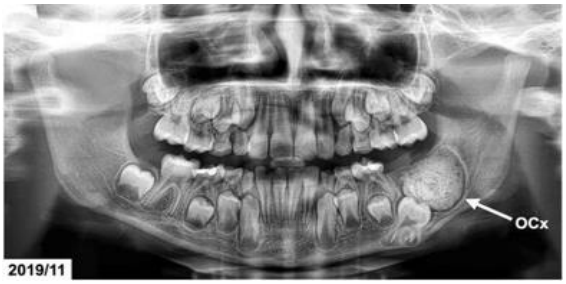
An 8-year-old boy (8 years, 10 months) was referred to the Department of Oral Surgery at the Medical University in Warsaw in November 2019 due to a non-erupted mandibular left first permanent molar. The patient was otherwise healthy, with no history of trauma or previous orthodontic treatment.

Facial examination showed a symmetrical, well-proportioned face with a slightly retruded chin and competent lips. No functional or parafunctional oral habits were noted. At the early mixed dentition stage, all incisors and first molars had erupted except for the mandibular left first molar. The primary dentition was intact, though oral hygiene was poor, with multiple restorations in the primary molars.

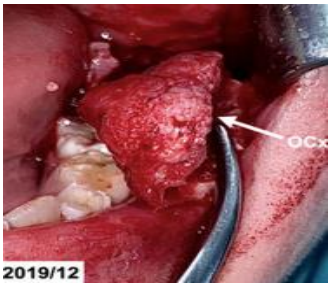
The dental evaluation revealed a Class II molar relationship, increased overjet and overbite, and mild crowding in the upper anterior segment. A small portion of the impacted mandibular left first molar crown was visible through the gingiva **(Figure 1a)**. Diagnostic records, including intraoral and extraoral photographs, cephalometric radiographs, and study models, were obtained prior to treatment. Examination also identified a painless, slightly enlarged lymph node, distinguished from bony swelling caused by the lesion. Intraoral findings included active caries, worn teeth, and no soft tissue inflammation; alveolar bone morphology appeared normal.



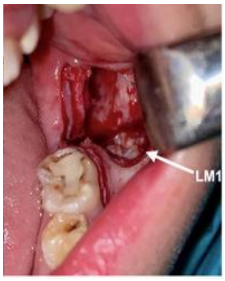
a)



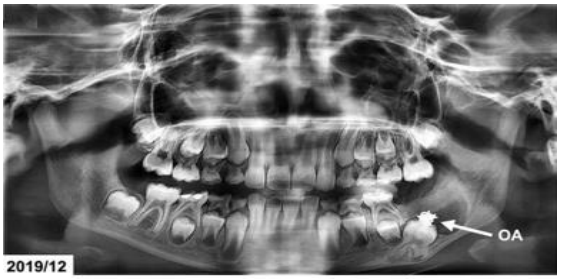
b)



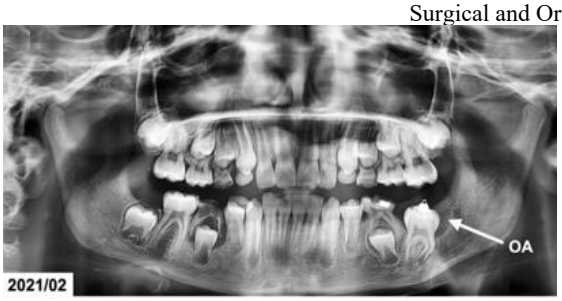
c)



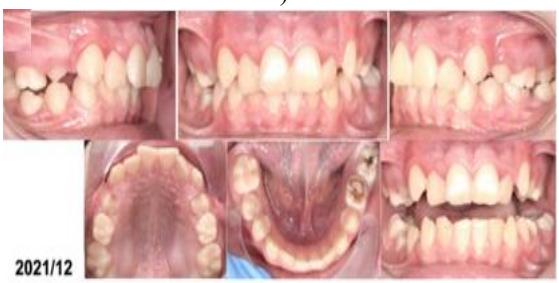
d)



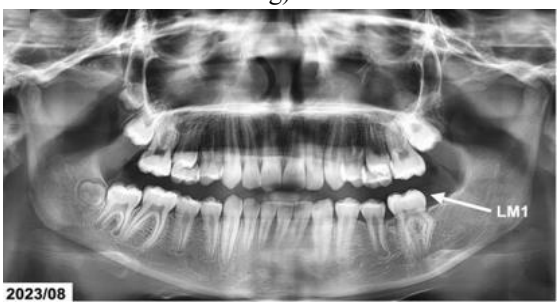
e)



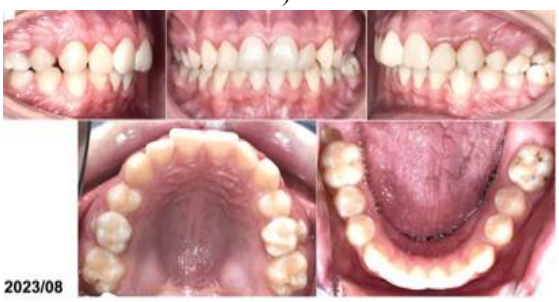
f)



g)



h)



i)

Figure 1. (a) Intraoral view prior to surgical and orthodontic intervention, patient aged 8 years and 10 months. (b) Preoperative panoramic radiograph showing a calcified lesion in the left mandibular molar region consistent with a complex odontoma (OCx). (c,d) Intraoperative photographs during tumor excision, revealing the occlusal surface of the unerupted mandibular left first permanent molar (LM1). Patient aged 8 years and 11 months. (e) Panoramic radiograph following tumor removal and bonding of the orthodontic attachment (OA) to the impacted molar. (f) Radiograph one year post-surgery, demonstrating the orthodontic attachment in place and initial occlusal movement of the tooth. Patient aged 10 years and 1 month. (g) Clinical view of the spontaneously erupted mandibular left first molar after removal of the orthodontic button, patient aged 10 years and 11 months. (h,i) Panoramic radiograph and intraoral photograph four years post-treatment, showing complete eruption of the molar and its position in the dental arch. Patient aged 12 years and 7 months.

Case description (Paraphrased)

The preoperative panoramic radiograph **(Figure 1b)** revealed a well-circumscribed calcified mass with a radiolucent halo, approximately 3 cm in diameter, situated distal to the mandibular left first permanent molar. To assess the lesion's exact size and position, the patient underwent cone-beam computed tomography (CBCT), which demonstrated a calcified mass resembling dental hard tissue, surrounded by a narrow radiolucent zone in the left mandibular molar area. The lesion measured 25 × 20 × 17 mm and extended to the inferior mandibular border. The adjacent first molar was displaced downward and mesially, with roots approximately two-thirds developed. Notably, the superior portion of the tumor lacked alveolar bone coverage (20 × 6 mm). Radiologically, the lesion was consistent with a complex odontoma.

The treatment plan involved complete surgical excision of the tumor and bonding of an orthodontic attachment to facilitate extrusion of the impacted molar using a removable lower appliance. This approach was selected due to limited biomechanics in a young patient and reimbursement considerations under Poland's National Health System.

Surgery was performed under local anesthesia with 2% lignocaine and noradrenaline. A triangular mucoperiosteal flap was reflected in the retromolar region to expose the tumor. The superficial bony layer covering the lesion was removed using a round bur with copious saline irrigation. The tumor was carefully separated and entirely removed without harming the unerupted first molar **(Figures 1c and 1d)**. The surgical site was irrigated with metronidazole solution, and the orthodontic attachment was bonded to the occlusal surface of the exposed molar **(Figure 1e)**. The flap was repositioned, sutured, and the excised tissue sent for histopathological analysis. Postoperatively, the patient received amoxicillin/clavulanic acid (500/125 mg) every 12 hours for 7 days. Follow-up after one week confirmed uneventful healing and suture removal.

Histopathological examination of decalcified sections with H&E staining confirmed disorganized dentinal tissue with irregular borders, consistent with a complex odontoma.

A removable lower plate was fabricated with an extension to attach elastics to the bonded button on the

molar in March 2020. However, due to COVID-19 restrictions, the appliance was not delivered until February 2021. Remarkably, the patient reported spontaneous eruption of the impacted tooth during this interval. At clinical examination, the occlusal surface of the mandibular left first molar with the bonded button was visible, and panoramic imaging **(Figure 1f)** confirmed upward movement and normal healing.

By December 2021, the molar had erupted into the oral cavity **(Figure 1g)**, with panoramic imaging showing only distal root bending. The patient was subsequently fitted with an activator containing an expansion screw to address Class II malocclusion and maxillary crowding. By August 2023, the tooth had fully erupted and root development was complete **(Figures 1h and 1i)**. A dilaceration of the distal root, attributed to prior tumor proximity, was noted. Long-term prognosis is favorable, contingent on maintenance of good oral hygiene, and complete regeneration of the alveolar bone defect was observed. No other permanent molars were present on the tumor-affected side, and orthodontic treatment with the removable appliance continues.

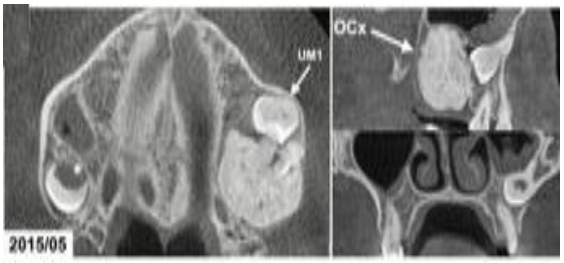
Case 2

A 15-year-10-month-old girl was referred by her family dentist to the Department of Oral Surgery at the Medical University in Warsaw in May 2015 for evaluation of impacted maxillary molars on the right side and an intraosseous lesion in the posterior maxilla. The lesion had been detected on a panoramic radiograph obtained by the referring dentist.

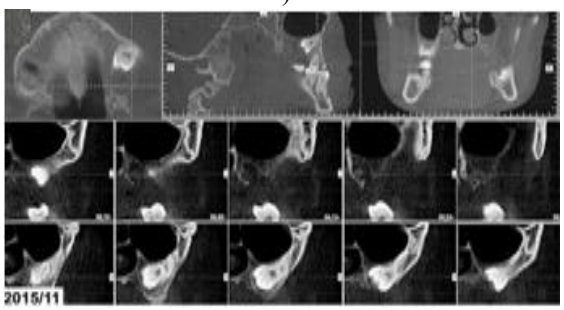
The patient was in good general health, with no history of prior orthodontic treatment or dental trauma. She reported no pain, facial discomfort, or temporomandibular joint symptoms and had no esthetic concerns or desire for orthodontic intervention. Extraoral examination revealed a symmetric face with proportional features and a straight profile. Intraoral assessment showed the absence of right maxillary molars. Oral hygiene was satisfactory, with no active caries or large restorations. The alveolar process in the posterior maxilla was slightly enlarged but non-tender and free from soft tissue inflammation. Palpation of regional lymph nodes revealed no abnormalities.

Dentally, the patient exhibited Class I canine and molar relationships with no arch length discrepancies. Overjet and overbite were within normal limits. A posterior crossbite was noted on the right side, accompanied by a minor 1 mm deviation of the lower dental midline to the left; the upper midline coincided with the facial midline. No abnormalities were observed in the hard or soft tissues of the teeth or periodontium.

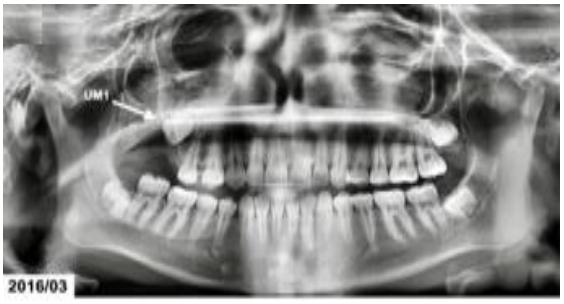
A panoramic radiograph (provided by the patient) revealed a well-circumscribed radiopaque lesion with a surrounding narrow radiolucent halo in the posterior right maxilla, corresponding to the region of the impacted first permanent molar **(Figure 2a)**. The lesion was suspected to be the primary cause of the tooth impaction.



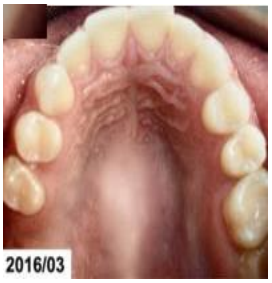
a)



b)

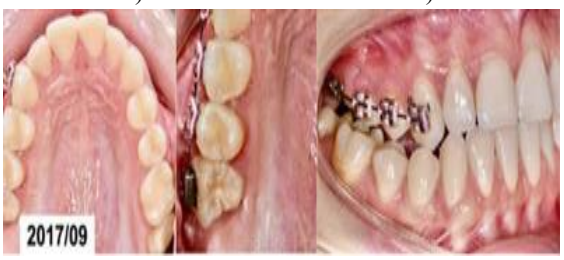


c)

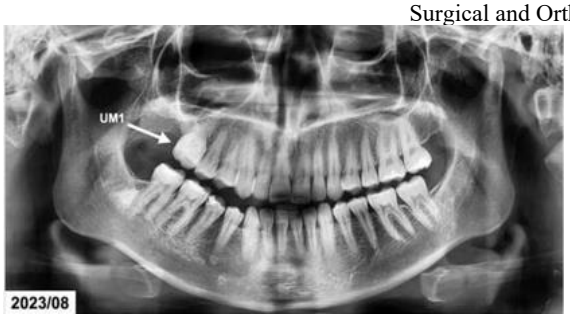


d)

e)

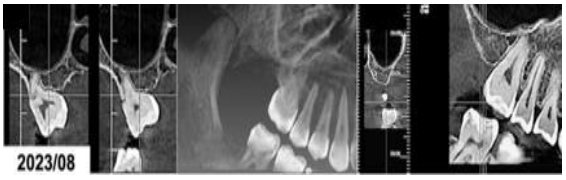


f)



g)

h)



i)

Figure 2. (a) Preoperative CBCT scan demonstrating a radiopaque lesion in the posterior right maxilla. Patient age: 15 years, 10 months. (b) CBCT following surgical removal, showing the displaced upper right first molar. Patient age: 16 years, 4 months. (c) Postoperative panoramic radiograph revealing the impacted tooth. Patient age: 16 years, 7 months. (d,e) Intraoral images 10 months after surgery, prior to initiation of orthodontic traction using a segmented fixed appliance. Patient age: 16 years, 7 months. (f) Clinical view 1 year and 4 months after extrusion of the impacted molar. Patient age: 17 years, 10 months. (g,h) Panoramic and intraoral images six years after treatment showing full eruption of the molar. Patient age: 24 years, 1 month. (i) CBCT six years post-treatment illustrating the erupted molar and the alveolar bone defect at the tumor site. Patient age: 24 years, 1 month.

Case 2 treatment narrative

To better evaluate the lesion, a CBCT scan was performed. Imaging revealed a roughly spherical, radiopaque mass in the posterior right maxilla, encircled by a thin radiolucent rim, measuring 16 × 18 × 20 mm **(Figure 2b)**. The upper right first permanent molar was fully formed but impacted in a distoangular position, with its crown in contact with the tumor. The adjacent second and third molars were congenitally absent. Radiographically, the lesion appeared consistent with a complex odontoma.

The treatment plan consisted of complete surgical excision of the odontoma and orthodontic guidance of the impacted molar. During surgery, an orthodontic button was bonded to the tooth, with a soft ligature for traction. Because the patient did not wish to undergo full orthodontic treatment for her mild posterior crossbite, a segmented fixed appliance was applied to the maxillary posterior segment on the right side, including the canine and premolars. Orthodontic traction was planned only if the molar failed to erupt spontaneously, and the patient declined any skeletal anchorage devices (TADs).

Surgery was performed under local anesthesia (2% lignocaine with noradrenaline). A trapezoidal flap was reflected to expose the lesion, and the overlying buccal cortical bone was removed with a round bur under saline irrigation. The tumor was completely excised without harming the underlying molar. The cavity was curetted and irrigated with metronidazole. An orthodontic attachment was bonded to the molar and connected to the second premolar via a metal ligature. The flap was repositioned and sutured, and the specimen was sent for histopathology. Postoperatively, amoxicillin/clavulanic acid (0.625 g every 12 hours for 7 days) was prescribed. Healing was uneventful, and sutures were removed after 7 days.

Histological analysis confirmed a complex odontoma, composed of mature tubular dentin interspersed with small amounts of enamel matrix and immature enamel. The impacted molar was monitored for spontaneous eruption; however, no movement was observed over the next 10 months **(Figures 2c–2e)**.

Consequently, orthodontic traction was initiated using a segmented fixed appliance (0.022 slot, American Orthodontics Mini Master series). Brackets were bonded on the canine and premolars, and alignment was completed in three months using a 0.017 × 0.022-inch stainless steel wire. Elastomeric power chains attached the impacted molar to the appliance, with adjustments every 5–6 weeks.

After 1 year and 4 months, the impacted molar was successfully extruded into the oral cavity **(Figure 2f)**. The patient declined further treatment to correct the crossbite; the appliance was removed without retention. Five years later, the molar remained fully erupted and asymptomatic **(Figures 2g and 2h)**. CBCT demonstrated a persistent alveolar bone defect at the site of tumor removal **(Figure 2i)**, and bone grafting was recommended prior to any implant placement.

Odontomas represent the most common type of intraosseous odontogenic lesions, typically identified during the first two decades of life. These lesions can

interfere with the normal eruption of adjacent teeth, resulting in delayed eruption, impaction, or occlusal disturbances [18, 28, 30]. In the two cases presented, the odontomas were located in the posterior regions of the mandible or maxilla, leading to the absence and impaction of neighboring permanent teeth. Since both patients were in growth phases at different stages of dental development, the missing posterior teeth were not immediately noticed by either the patients or their families. However, in Case 2, earlier detection could have been possible during a routine dental examination. Both lesions were largely asymptomatic, with only mild enlargement of the alveolar process in the affected regions. In Case 1, the lesion was identified on a panoramic radiograph taken as part of a routine orthodontic assessment, whereas in Case 2, clinical examination revealed the absence of a maxillary first molar, which was subsequently confirmed by radiography as being impacted by a complex odontoma. In both scenarios, surgical removal of the tumor was performed, and orthodontic management was planned to address the impacted teeth. These cases underscore the importance of interdisciplinary collaboration in managing growing patients with odontomas, where pediatric dentists may first identify the lesion and orthodontists contribute to the post-surgical treatment plan.

It is crucial to differentiate complex odontomas from other odontogenic tumors, such as ossifying fibromas, osteomas, cemento-osseous dysplasias, ameloblastic fibromas, ameloblastic fibro-odontomas, and calcifying odontogenic cysts, using both radiological and histopathological features [7, 16, 18, 21]. Tumors previously classified as ameloblastic fibro-odontomas (AFOs) or ameloblastic fibrodentinomas (AFDs) exhibit a combination of calcified dental tissues and soft tissue reminiscent of an ameloblastic fibroma, appearing intermediate between an ameloblastic fibroma and an odontoma. Although AFOs and AFDs are now often considered developing odontomas, cases with aggressive biological behavior suggest a neoplastic nature. Molecular studies, including BRAF p.V600E mutation analysis, further differentiate these entities, as such mutations are typically present in AFs but absent in complex odontomas [5, 9, 14]. In both presented cases, histopathological examination confirmed the diagnosis of complex odontoma.

The precise etiology of odontomas remains unclear. Various factors have been implicated, including trauma, inflammation, and genetic predispositions. In the current cases, no history of trauma, dental pathology, or family history of impacted teeth was reported. Both patients lacked second and third molars in the tumor-affected areas, likely as a consequence of the odontoma's presence [25, 31]. Similar findings have been reported, such as in Liu *et al*. (1997), where impaction and absence of posterior molars were associated with odontomas, suggesting interference with normal tooth development [31].

Surgical excision of the odontoma while preserving adjacent teeth is considered the treatment of choice [2, 24, 32]. Early removal increases the likelihood of spontaneous eruption of impacted teeth, particularly if root development is incomplete. Factors influencing post-surgical outcomes include the position of the impacted tooth, root morphology, stage of development, and available space within the dental arch [11, 17, 28, 30, 32]. Treatment typically involves tumor removal, exposure of the impacted tooth, and bonding of an orthodontic attachment to facilitate extrusion. Teeth with developing roots are more likely to erupt spontaneously after surgery, emphasizing the importance of early diagnosis by family dentists and referral to oral surgery specialists when eruption disturbances are noted. Extraction should only be considered if tumor removal would compromise the adjacent teeth [24, 25, 32].

In Case 1, early detection during the mixed dentition phase allowed the permanent molar to erupt spontaneously following surgical removal, eliminating the need for orthodontic traction. Orthodontic monitoring should continue until the tooth reaches functional occlusion [3, 4, 8, 11, 13, 29, 30]. Studies have reported variable outcomes: Hidalgo-Sánchez *et al*. noted that most teeth erupted without the need for orthodontics, while Isola *et al*. found that only a minority of impacted teeth erupted spontaneously, with the majority requiring combined orthodontic-surgical intervention [2, 13]. Success depends on factors such as root development stage, tooth position, and proximity to neighboring teeth [3, 16, 17, 18, 24, 28–33].

In Case 2, the first molar had completed root development at the time of tumor removal, precluding spontaneous eruption. Orthodontic traction with a segmented fixed appliance was therefore required to achieve proper alignment. Early detection could have minimized the need for such intervention. While orthodontic appliances carry potential risks, including enamel demineralization, root resorption, and soft tissue irritation, the impacted tooth in this case was successfully extruded without additional anchorage devices, such as TADs. Placement of TADs in areas previously occupied by a large tumor can be challenging, necessitating alternative anchorage strategies such as palatal TADs.

Recurrence of odontomas is rare, and the prognosis is excellent [5, 7, 8, 10]. Observational studies of

asymptomatic odontomas have shown minimal changes in size or location over several years, reflecting their limited growth potential and lack of malignant transformation. Surgical removal with histopathological confirmation, followed by orthodontic management if necessary, remains the standard of care [5, 25, 28–30, 34–37]. In both presented cases, no tumor recurrence was observed.

Conclusion

Large odontomas in posterior regions can cause displacement and impaction of adjacent molars. Early diagnosis and surgical removal—preferably before root formation is complete—may allow spontaneous eruption of affected teeth. Surgical treatment should aim to preserve neighboring teeth, and orthodontic extrusion is often required for alignment of impacted molars. Effective management relies on interdisciplinary cooperation among pediatric dentists, oral surgeons, and orthodontists to ensure optimal functional and esthetic outcomes in growing patients.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

References

1. Neville BW, Damm DD, Allen CM, Chi AC, editors. Odontogenic cysts and tumors. In: Oral and Maxillofacial Pathology. 4th ed. Ottawa (ON): Saunders; 2016. p. 674–5. ISBN: 978-1-4557-7052-6.
2. Hidalgo-Sánchez O, Leco-Berrocal MI, Martínez-González JM. Meta-analysis of the epidemiology and clinical manifestations of odontomas. Med Oral Patol Oral Cir Bucal. 2008;13(11):E730–4.
3. 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;70(6):e516–20.
4. Kämmerer PW, Schneider D, Schiegnitz E, Schneider S, Walter C, Frerich B, et al. Clinical parameters of odontoma with special emphasis on treatment of impacted teeth—a retrospective multicentre study and literature review. Clin Oral Investig. 2016;20(8):1827–35.
5. El-Naggar AK, Chan JKC, Grandis JR, Takata T, Slootweg PJ, eds. WHO Classification of Head and Neck Tumours. 4th ed. Lyon (France): IARC; 2017. p. 224–6.
6. Thompson LDR. Odontoma. Ear Nose Throat J. 2021;100(Suppl 5):536S–7S.
7. Khalifa C, Omami M, Garma M, Slim A, Sioud S, Selmi J. Compound-complex odontoma: A rare case report. Clin Case Rep. 2022;10(10):e05658.
8. Boffano P, Zavattero E, Roccia F, Gallesio C. Complex and compound odontomas. J Craniofac Surg. 2012;23(3):685–8.
9. DeColibus KA, Rasner DS, Okhuaihesuyi O, Owosho AA. Clinicoradiopathologic analysis of odontomas: A retrospective study of 242 cases. Dent J (Basel). 2023;11(7):253.
10. Nelson BL, Thompson LDR. Compound odontoma. Head Neck Pathol. 2010;4(4):290–1.
11. Küchler EC, da Silva Fidalgo TK, Farinhas JA, de Castro Costa M. Developmental dental alterations in permanent teeth after intrusion of the predecessors: Clinical and microscopic evaluation. Dent Traumatol. 2010;26(6):505–8.
12. Buchner A, Merrell PW, Carpenter WM. Relative frequency of central odontogenic tumors: A study of 1088 cases from Northern California and comparison to studies from other parts of the world. J Oral Maxillofac Surg. 2006;64(9):1343–52.
13. Isola G, Cicciù M, Fiorillo L, Matarese G. Association between odontoma and impacted teeth. J Craniofac Surg. 2017;28(3):755–8.
14. Vered M, Wright JM. Update from the 5th Edition of the World Health Organization Classification of Head and Neck Tumors: Odontogenic and maxillofacial bone tumours. Head Neck Pathol. 2022;16(1):63–75.
15. Soluk-Tekkesin M, Cakarer S, Aksakalli N, Alatli C, Olgac V. New World Health Organization classification of odontogenic tumours: Impact on the prevalence of odontogenic tumours and analysis of 1231 cases from Turkey. Br J Oral Maxillofac Surg. 2020;58(9):1017–22.
16. Choudhary PJ, Gharote HP, Hegde K, Gangwal P. Compound odontoma associated with impacted teeth: A case report. IJSS Case Rep Rev. 2014;1(2):12–5.
17. Silva DR, Shahinian AL. Odontoma malformation and disturbances of eruption subsequent to traumatic dental injuries: A literature review and a case report. Dent Traumatol. 2022;38(1):98–104.
18. Astekar M, Manjunatha BS, Kaur P, Singh J. Histopathological insight of complex odontoma

associated with a dentigerous cyst. BMJ Case Rep. 2014;2014:bcr2013200316.
19. Martinez A. Odontoma. PathologyOutlines.com [Internet]. Available from: https://www.pathologyoutlines.com/topic/mandiblemaxillaodontoma.html. Accessed 2024 Apr 20.
20. Soliman N, Al-Khanati NM, Alkhen M. Rare giant complex composite odontoma of mandible in mixed dentition: Case report with 3-year follow-up and literature review. Ann Med Surg (Lond). 2022;74(1):103355.
21. Park JC, Yang JH, Jo SY, Kim BC, Lee J, Lee W. Giant complex odontoma in the posterior mandible: A case report and literature review. Imaging Sci Dent. 2018;48(4):289–93.
22. de Oliveira Ribas M, Martins WD, de Sousa MH, de Aguiar Koubik AC, Avila LF, Zanferrari FL, Martins G. Oral and maxillofacial manifestations of familial adenomatous polyposis (Gardner's syndrome): A report of two cases. J Contemp Dent Pract. 2009;10(2):82–90.
23. Shafer GW, Hine MK, Levy BM. A Textbook of Oral Pathology. 4th ed. Philadelphia (PA): WB Saunders; 1983. p. 308–11.
24. Abdul M, Pragati K, Yusuf C. Compound composite odontoma and its management. Case Rep Dent. 2014;2014(1):107089.
25. Satish V, Prabhadevi MC, Sharma R. Odontome: A brief overview. Int J Clin Pediatr Dent. 2011;4(3):177–85.
26. Fujii S, Nagata K, Matsumoto S, Kohashi KI, Kikuchi A, Oda Y, et al. Wnt/β-catenin signaling, which is activated in odontomas, reduces Sema3A expression to regulate odontogenic epithelial cell proliferation and tooth germ development. Sci Rep. 2019;9(1):4257.
27. Wang XP, O'Connell DJ, Lund JJ, Saadi I, Kuraguchi M, Turbe-Doan A, et al. Apc inhibition of Wnt signaling regulates supernumerary tooth formation during embryogenesis and throughout adulthood. Development. 2009;136(11):1939–49.
28. Hisatomi M, Asaumi JI, Konouchi H, Honda Y, Wakasa T, Kishi K. A case of complex odontoma associated with an impacted lower deciduous second molar and analysis of 107 odontomas. Oral Dis. 2002;8(2):100–5.
29. Delbem AC, Cunha RF, Bianco KG, Afonso RL, Gonçalves TC. Odontomas in pediatric dentistry: Report of two cases. J Clin Pediatr Dent. 2005;30(2):157–60.
30. de Oliveira BH, Campos V, Marçal S. Compound odontoma—diagnosis and treatment: Three case reports. Pediatr Dent. 2001;23(2):151–7.
31. Liu JK, Hsiao CK, Chen HA, Tsai MY. Orthodontic correction of a mandibular first molar deeply impacted by an odontoma: A case report. Quintessence Int. 1997;28(6):381–5.
32. Jain A, Karuna YM, Baliga M, Suprabha BS, Natarajan S. Surgical management of complex odontoma associated with agenesis of a molar. Contemp Clin Dent. 2018;9(Suppl 2):S388–90.
33. Tuczyńska A, Bartosik D, Abu-Fillat Y, Sołtysik A, Matthews-Brzozowska T. Compound odontoma in the mandible—case study and literature review. Dev Period Med. 2015;19(4):484–9.
34. Vengal M, Arora H, Ghosh S, Pai KM. Large erupting complex odontoma: A case report. J Can Dent Assoc. 2007;73(2):169–73.
35. Pacifici A, Carbone D, Marini R, Pacifici L. Surgical management of compound odontoma associated with unerupted tooth. Case Rep Dent. 2015;2015(1):902618.
36. Barros LD, Pedron IG, Utumi ER, Zambon CE, Rocha AC. Complex odontoma: Report of a five-year follow-up case. J Dent Child (Chic). 2010;77(3):183–6.
37. de Vasconcellos Machado C, Knop LAH, da Rocha MCBS, da Silva Telles PD. Impacted permanent incisors associated with compound odontoma. BMJ Case Rep. 2015;2015:bcr2014208201.