

the tooth is cut, then the crown is extracted first and then the root; (F) After completing the extraction, the residual bone cavity and dental structure, if visible, is analysed. In this case, the root apex of 41 is visible and the vitality of this tooth will be evaluated during the follow-up; (G) The denticles of the odontoma begin to be exposed. In this case, there are only 4 single neoformations positioned in the bone structure and detached from each other, thus being even more difficult to find because they were not all four fused together.

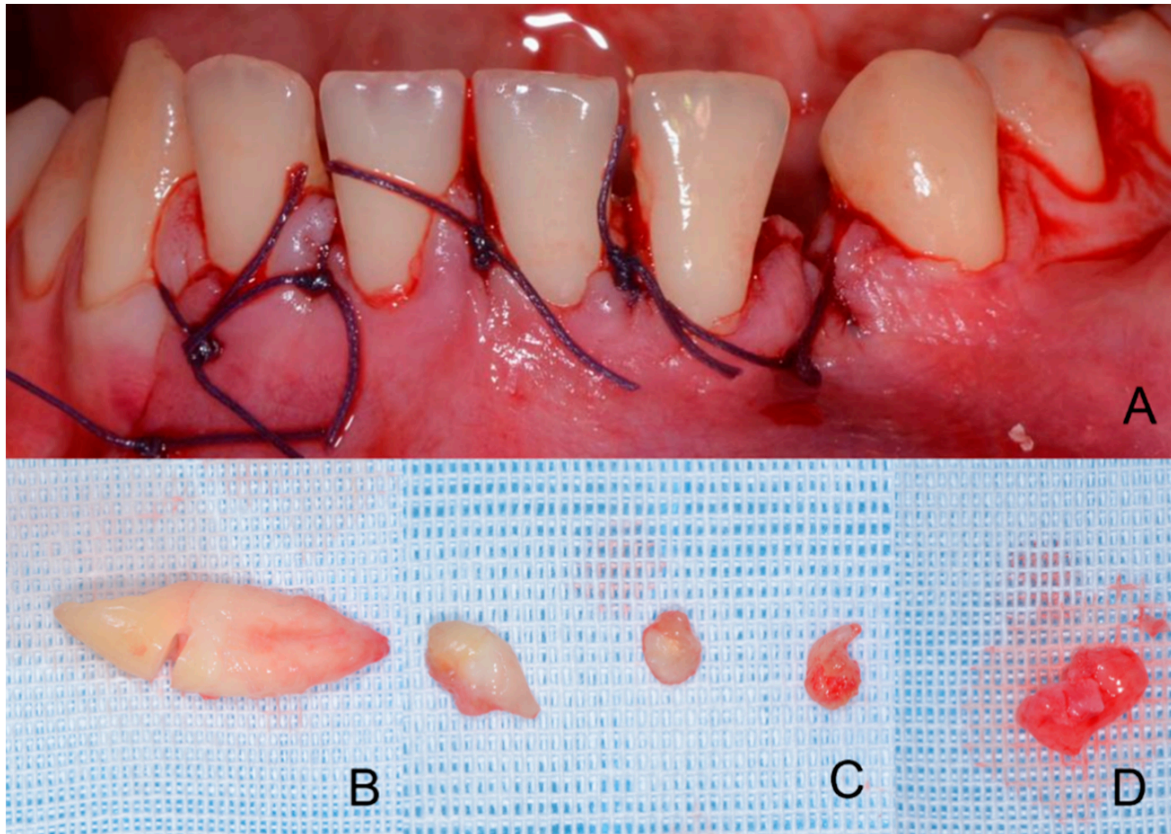


Figure 13. Post-operative images. (A) Frontal intraoral image with the suture of the flap (Vicryl Ethicon 3.0, 22 mm 1/2c, Johnson & Johnson International, Hamburg, Germany); (B) Image of the extracted canine; (C,D) The four extracted denticles which were part of the odontoma.

2. Literature Review

The search strategy identified 124 potential articles: 33 from PubMed and 91 from Google Scholar. After removal of duplicates, 91 articles were analysed. Subsequently, 71 papers were excluded because they did not meet the inclusion criteria and were not relevant to the subject of the study. The remaining 20 papers were included [13–32].

The studies included (Table 1) in the present review of the literature were published between 2002 and 2015. The total sample size of the analysed odontomas was 1279 (range: 11–163). All cases were given the subclassifications of complex or compound odontoma, and the ratio was 1:0.92. No gender predilection was seen in the overall sample, where the male to female ratio was 1:0.98. Information on the management of the involved teeth could not be obtained, as there were not available reports.

Table 1. Review of the literature related to compound and complex odontoma.

Author	Year	Analysed Odontomas	Compound	Complex	Female	Male
Boffano [13]	2012	52	20	32	26	26
Iatrou [14]	2010	26	15	9	12	14
An [15]	2012	73	45	28	38	35
El-Gehani [16]	2009	29	19	10	19	10
Ochsenius [17]	2002	163	71	92	85	77
Sekerci [18]	2015	35	24	11	24	11
Luo [19]	2009	80	33	47	38	42
da Silva [20]	2009	48	34	14	22	26
Taghavi [21]	2013	27	17	10	8	19
Hisatomi [22]	2002	106	62	44	51	55
Tomizawa [23]	2005	38	31	7	15	23
Amado [24]	2003	61	38	23	29	32
Pippi [25]	2006	28	15	13	11	17
Fernandes [26]	2005	85	33	52	38	47
Saghravanian [27]	2010	44	17	27	16	18
Jing [28]	2007	78	20	58	40	38
Soluk [29]	2012	160	57	99	80	80
Tamme [30]	2004	26	12	14	18	8
Olgac [31]	2006	109	42	67	50	59
Tawfik [32]	2010	11	7	4	8	3
Total		1279	612	661	628	640

3. Discussion

Compound odontoma is a benign odontogenic tumour and it is usually diagnosed in young adults during regular radiological examination performed to assess the reason of a missing or mispositioned tooth in permanent dentition [33].

At the clinical level, compound odontoma can often be associated with anterior teeth misalignment and tooth eruption disorders, with possible impaction and delayed tooth eruption. One quarter of patients are asymptomatic, but compound odontoma can also be characterized by pain (13.3%) and swelling (8.9%) [34]. The preferred localization of compound odontomas is the anterior maxilla (81.8%) [33].

Surgical removal is the usual treatment and recurrence is rare [35].

In the clinical cases presented here, it was possible to refer the patient for orthodontic treatment of the impacted canine only in the first case, when the inclusion concerned the upper left canine. In this case, the odontoma blocked the physiological eruption of the canine, but did not cause it to be misaligned. In fact, the canine position was vertical, even if slightly vestibular, placed above the odontoma.

In the remaining two cases, the position of the odontoma was in the front part of the mandible and was associated with the inclusion of the canine, which was unfavourable for orthodontic treatment. In fact, in both cases, we proceeded with both the surgical enucleation of the odontoma and the extraction of the impacted canine, and in one case, also the extraction of the lateral impacted transmigrated incisor. In both cases, the large volume occupied by the odontoma, and late diagnosis certainly contributed to the displacement of the canine from its physiological site towards the mesial position, almost completely horizontal towards the bottom of the mandible on the inferior cortex, in line with the entire symphysis area of the chin.

This type of tooth displacement is called transmigration. Transmigration most commonly concerns the permanent canines and is characterized by the movement of a non-erupted tooth that crosses the median line of the mandible and goes to position itself in the opposite part of the anterior mandible, as in cases 2 and 3 of this report [36]. Transmigration is rare, with an incidence of 0.007–0.08% and a 1.3:1 female predilection [37]. Interestingly, in this report, both cases of compound odontoma associated with transmigration of the left lower canine and lateral incisor were observed in male patients at developmental age.

The presence of cysts and tumours can alter the eruption pathway and cause tooth transmigration. The transmigrated teeth typically present unilaterally with a certain degree of angulation. In case 2, the angulation was almost horizontal to the lower jawline, while the transmigrated canine in case 3 presented a 60-degree angulation to the corresponding long axis of the first lower premolar [38,39].

The treatment of choice for transmigrated canines in association with vast compound odontoma is extraction. Orthodontic reposition of transmigrated canines is usually reserved for mild cases [40].

Few cases in the literature could be found with transmigrated canines being transplanted following endodontic therapy [41].

However, the management of bone gaps after surgical excision treatment of large lesions may require regenerative approaches using a combination of three-dimensional structures and new therapeutic means [42].

4. Conclusions

This article has documented three cases of compound odontomas: one in the upper premaxilla and two in the mandible in patients at developmental age. All the cases were associated with canine impaction; however, only the maxillary-impacted canine underwent orthodontic treatment after surgery. The two mandibular canines associated with compound odontoma were transmigrated and no orthodontic therapy was possible due to the challenging near-horizontal position at the lower portion of the anterior mandibula.

Although the radiological and macroscopic features following surgical removal are pathognomonic, histological examination is always performed. As a diagnostic investigation in preparation for surgery, CBCT offers details on the morphology of the odontoma, its relationship with the surrounding dental structures, and the cortical bone profiles of the affected jaws.

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