



# Management of an Impacted Second Molar Associated with a Rare Orthokeratinized Odontogenic Cyst: A Case Report

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## Abstract

Tooth impaction is a common condition in dental practice, typically involving third molars or canines. The impaction of mandibular second molar is relatively rare. Most of the impacted teeth are asymptomatic. However, they can sometimes be associated with underlying lesions. One such lesion is the orthokeratinized odontogenic cyst, a rare developmental odontogenic cyst, characterized by its less aggressive clinical behavior. This association may lead to a challenging and complex management approach. In this paper, we present a case report of the surgical management of rare orthokeratinized odontogenic cyst accidentally discovered in a 15 year-old male patient during a routine orthodontic examination, associated with an impacted second mandibular molar.

## Subject Areas

Dentistry

## Keywords

Tooth Impaction, Second Molar Impaction, Odontogenic Cyst, Orthokeratinized Odontogenic Cyst

## 1. Introduction

Mandibular second molar [M2M] impaction is a serious eruption disorder [1], that disrupts dental development, as second molars play an important role in ensuring proper posterior vertical dimension [2].

Various factors contribute to this rare issue, including arch length discrepancy, lack of space, ankylosed primary teeth, pathology, trauma, and other im-

pediments [3] [4].

In some cases, M2M can be associated with developmental odontogenic cysts, the dentigerous cyst is the most commonly linked. Other odontogenic cysts can share a similar presentation, such as the odontogenic keratocyst [OKC] and the ortho-keratinized odontogenic cyst [OOC] [5].

OOC is a rare developmental cyst, originating from cell rests of dental lamina. It was initially described by Schultz in 1927, and is characterized by its less aggressive clinical behavior, that was described first by [6].

The objective of this report is to present a case of an OOC involving an impacted second mandibular molar in a 15-year old boy and its surgical management.

## 2. Case Report

A 15-year-old male patient with no medical history, was referred to the oral surgery department of the dental consultation and treatment center of Casablanca, by his dentist after an accidental discovery by chance of an osteolytic lesion surrounding an impacted tooth. The lesion was identified on a panoramic radiograph performed as a part of a routine orthodontic assessment, as the patient was planning to begin orthodontic treatment.

The extraoral examination revealed no swelling or tenderness upon palpation. However, a slight elevation was noted along the right lower border of the mandible.

The endobuccal examination didn't show any vestibular swelling and confirmed the absence of the tooth 47. The tooth 37 was in eruptive phase, and the pulp vitality of the tooth 46 was preserved (**Figure 1**).



**Figure 1.** Intra-oral image shows the absence of the 47.

The orthopantomography showed a well-defined radiolucent image surrounding the crown of the impacted 47, and extending from the distal surface of the 46 to the mesial surface of the 48 germ. The 46 had a resorption of the distal root.

The 47 had a slight distal angulation with deep impaction, a 90° bend in the mesial root and a distal root in hook-like shape. The inferior alveolar nerve [IAN] was superimposed over the roots of the 47 (**Figure 2**).



**Figure 2.** Orthopantomogram shows a well-defined radiolucent image surrounding the 47 impacted.

Cone beam computed tomography [CBCT] revealed the intermediate position of the NAI passing between the roots, and the thinning of both the buccal and lingual cortical plates, with a perforation at the cretal level (**Figure 3**).



**Figure 3.** CBCT showing the radiolucent image and the thinning of the vestibular and lingual cortical plates.

In light of these clinical and radiological findings, we considered several differential diagnosis, such as a dentigerous cyst, a unicystic ameloblastoma, an odontogenic keratocyst [OKC] and odontogenic myxoma.

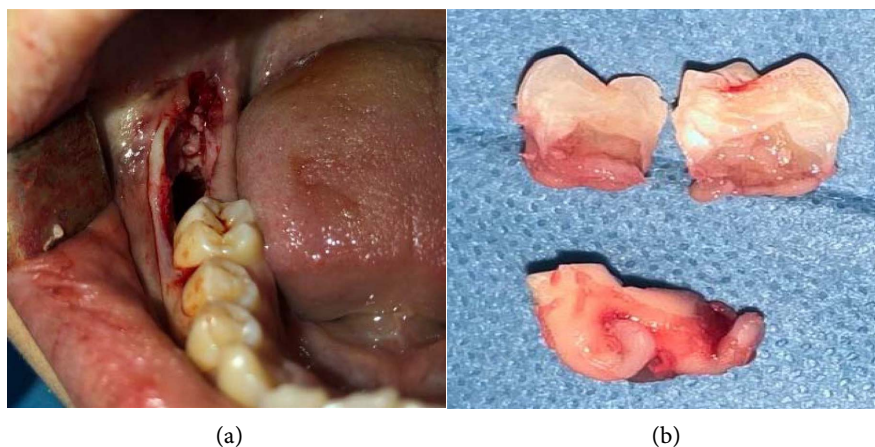
A biopsy was performed (**Figure 4**), which confirmed the diagnosis of an OOC.



**Figure 4.** The specimen with a butter-like and keratinous texture.

After discussing the case with the orthodontists at the university hospital center, and considering the root morphology of the 47 that may block the eruption and the uprighting, we decide to perform a cyst enucleation along with the extraction of tooth 47, 3 months later.

Under locoregional anesthesia, a full thickness mucoperiosteal flap was raised, followed by bone trepanation to access the lesion. Complete enucleation of the cyst was performed and tooth 47 was extracted. The cavity was then carefully curetted and irrigated with saline before closure (**Figure 5**).



**Figure 5.** (a): Intra-operative photo, (b): the tooth 47.

During surgery, the lesion involved the most of tooth germ 48, making its extraction necessary.

Postoperative care included antibiotic coverage was provided [amoxicillin 1000 mg, twice daily, 7 days] along with analgesic and anti-inflammatory medication [Prednisolon 60 mg, once a day, 3 days].

The specimen was fibrous rather than keratinous (**Figure 6**) and was sent for histopathological examination. The result was contradictory: an inflammatory cyst.



**Figure 6.** The specimen after enucleation, with a fibrous texture.

At 10 days follow-up, and 3-month clinical follow-up the patient was asymptomatic, with no signs of complications.

### 3. Discussion

OOC is a rare developmental odontogenic cyst. It was initially considered as a variant of the OKC. Subsequent studies have shown that OOC doesn't have the clinical behavior, histologic characteristics, PTCH1 gene mutation, nor association with the nevoid basal cell carcinoma syndrome [NBCCS] seen in OKC. Consequently, the WHO in 2017, reclassify this lesion as a distinct entity, due to its non-aggressive behavior, low recurrence and favorable prognosis [5] [7].

The OOC is less common than OKC accounting for about 1% of all odontogenic [5] [6], and approximately 10% of all keratinizing odontogenic jaw cysts [6]. OOC shows a male predominance and a higher frequency between the third and the fourth decade of life [5]. Our 15-year old patient represents a rare and atypical case.

The mandible is affected twice as often as the maxilla. The molar and ramus region are the most commonly involved sites [5] [6], and about 46.5% to 75% of OOCs are associated with an impacted tooth [6], as seen in our case.

The impaction of the mandibular second molar [M2M] is a rare eruption complication, with reported prevalence ranging from 0.03% to as high as 3%, depending on studies [2] [3] [8]-[10].

It occurs mostly unilaterally and slightly more in men than women [3], and It is more frequently observed in the mandible [3] [9] [11], which aligns with the findings of our case.

Mesial inclination is the most frequent position for impacted M2M, mainly due to an abnormal eruption path [2] [8]. In this case, the impacted tooth had a slight disto angulation.

Several studies have shown an association between odontogenic cysts and impacted teeth. Some researchers reported that in 16% of cases, cystic or neoplastic lesions develop near the impacted tooth [4]. Others suggested that not only the impacted tooth may contribute to the development of odontogenic lesions, but also space occupying lesions, may lead to tooth impaction [12]. Furthermore, both can arise independently without an association between them [12].

This bidirectional relationship presents a causality dilemma similar to the classic "chicken or egg" question, highlighting the need for further research and studies to clarify this issue.

Clinically, OOC and impacted teeth are asymptomatic. They are often discovered by chance, when a patient comes for a routine check-up [5] [6] [10], as was the case for our patient.

Radiographic examination is the first step in the diagnostic approach for the evaluation of impacted tooth, and related lesions [3] [4]. In fact more than 90% of lesions present a well demarcated unilocular lesion with or without impacted teeth [5] [6].

CBCT is recommended for an enhanced visualization of the impacted tooth, the lesions and the surrounding structures, particularly the IAN, aiding in precise diagnosis across spatial axes [2].

Histopathological examination remains the gold standard for confirming lesions. In this case, the difference between the results can be explained by the fact that OOC can lose its characteristic histological features when secondary inflamed, following a prior biopsy or marsupialization [5].

The management of impacted second molar has always been a challenge for the orthodontist and oral surgeon, especially when it's asymptomatic and associated with an odontogenic cyst, as in our case.

If left untreated, impacted teeth lead to several complications, including malalignment, tooth crowding, resorption of adjacent teeth, infection, ankylosis, odontogenic cysts, and tumors... [4] [11] [12]. In this case, the tooth 46 shows resorption of the distal root.

Various factors should be considered for the treatment plan, such as the age of the patient, cyst size, relation to important anatomical structures, root anomalies like dilaceration, root resorption or ankylosis. The angulation or inclination of the impacted molar, however, does not seem to be as important a factor as it might seem [9] [13].

Several treatment options can be assessed.

Ideally, marsupialization should be considered first for the children with lesions involving impacted permanent teeth, to allow a spontaneous eruption after decompression [13]. However, in this case, the root morphology may prevent the tooth 47 from erupting or being uprighted orthodontically, so the decision of the extraction was straightforward, along with complete enucleation and curettage of the OOC.

The recurrence rates of OOC are rare, accounting for less than 2%, so no long term follow up is required [5].

The patient was asymptomatic at the 3-month follow-up, and he is still under observation.

## 4. Conclusion

The management of the second molar impacted tooth associated with an odontogenic lesion is one of the most challenging and complicated types of dento-alveolar surgery. Proper diagnosis and treatment planning requires a multidisciplinary approach to ensure optimal outcomes for patients.

## Patient Consent

Both written and oral informed consent were obtained from the patient's parent for the publication of this case report and any accompanying images.

## Conflicts of Interest

The authors confirm that this article's content has no conflict of interest.

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