International Dentistry Journal
Case Report (ISSN: 3065-4505)

Case Report: Surgical Approaches to Ectopic Mandibular Third Molars

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Citation: *Jeff Brooks, Brett Wilson, Franklin Garcia-Godoy, Patrick Richards, Jon Howell. Case Report: Surgical Approaches to Ectopic Mandibular Third Molars. Int Dent Jour. 2025;4(1):1-8.*

Received Date: 07 January, 2025; **Accepted Date:** 13 Monday, 2025; **Published Date:** 15 January, 2025

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INTRODUCTION

The presence of impacted mandibular third molars is a common condition seen in approximately 20-30% of the population with a higher frequency in females. However, ectopic mandibular third molars displaced from their normal anatomic position, such as in the ramus, condyle, or coronoid process, are a rare phenomenon. The etiology is largely unknown, however, most ectopic mandibular third molars have associated pathologic lesions with dentigerous cyst being the most common. Indications for extraction include associated pathology, risk of mandible fracture, and presence of symptoms such as pain and trismus. Due to the variation of position of ectopic mandibular third molars, multiple surgical approaches may be indicated.

In this report, we present two cases of mandibular ectopic third molars with associated pathology and compare the intraoral versus extraoral surgical approach taken in each respective case.

CASE REPORT

The first patient, a 50-year-old Caucasian woman presented to the University of Tennessee Oral and Maxillofacial Surgery clinic in August of 2024 complaining of right mandibular pain and periauricular pain with intermittent swelling for approximately 1 year. She endorses that she originally went to her general dentist who was unable to diagnose the cause of her pain, and was subsequently referred to ENT and an outside OMFS prior to being seen in our clinic. Clinical examination revealed no obvious facial asymmetry or lymphadenopathy. There was noted trismus on examination. The patient denied any trigeminal paresthesia or facial nerve palsy. The patient denied any TMJ pain. Panoramic radiograph (Figure 1) showed a full bony impacted #32 located in the superior aspect of R mandibular ramus just inferior to condylar neck with an associated radiolucency. A CBCT was obtained showing buccal cortical breakthrough (Figure 2B). The associated lesion measured approximately 1.5 cm x 1.5 cm. IAN appeared intact on imaging, coursing just medial to lesion and tooth #32. TMJ fully seated in fossa bilaterally with no bony abnormalities.

Figure 1: Pre-operative panorex radiograph of 50-year-old female patient showing ectopic mandibular third molar, tooth #32, located in R subcondylar/ramus of mandible.

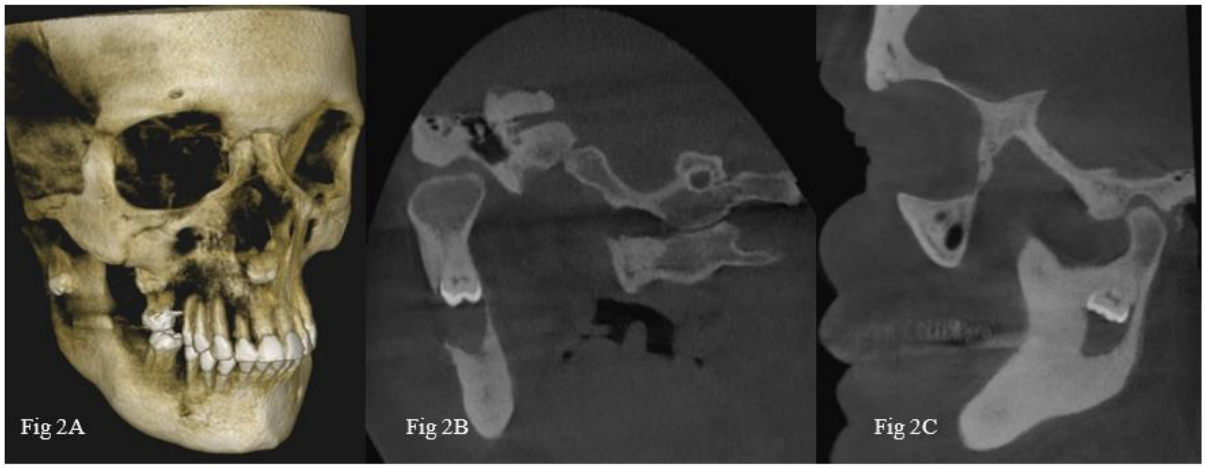

Figure 2A: Pre-operative 3D CBCT radiograph of 50-year-old female patient showing ectopic mandibular third molar, tooth #32, located in R subcondylar/ramus of mandible. **Figure 2B:** Preoperative CBCT coronal slice showing buccal cortical breakthrough from #32 and associated radiolucency. **Figure 2C:** Preoperative CBCT sagittal slice showing #32 and associated radiolucency.

The patient had no significant medical history and was taking no medications. Previous surgeries included adenoidectomy, tonsillectomy, and cholecystectomy with no anesthesia complications.

The second patient, a 45-year-old Caucasian male presented to the University of Tennessee Oral and Maxillofacial Surgery clinic in October of 2024 with a 2-month history of pain and swelling to the left side of his face. The patient stated that he hit his face on a tree while on a rope swing in June of 2024, and had recurrent pre-auricular edema with associated trismus since that time. He also reports experiencing soreness and intermittent foul taste in

his mouth. The patient was seen by a general dentist and an endodontist and placed on Amoxicillin prior to being referred to our clinic. Clinical examination negative for edema or intraoral fistula. The patient denied CN V or CN VII paresthesia or palsy respectively. Tooth #17 was not clinically visible. Panorex radiograph imaging revealed impacted tooth #17 with associated radiolucent lesion (Figure 3). CBCT imaging confirms finding with the lesion measuring approximately 10 mm x 7 mm in the superior ramus of the L mandible (Figure 4). No buccal or lingual perforations noted. TMJ fully seated in fossa bilaterally with no bony abnormalities.

Figure 3: Pre-operative panorex radiograph of 45-year-old female patient showing ectopic mandibular third molar, tooth #17, located in L superior ramus of mandible.

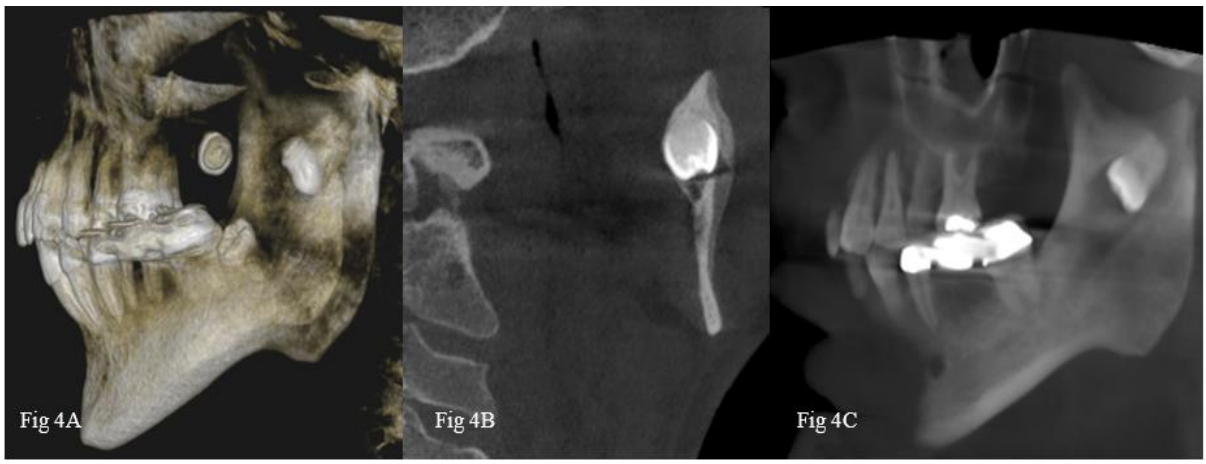

Figure 4A: Pre-operative 3D CBCT radiograph of 45-year-old male patient showing ectopic mandibular third molar, tooth #17, located in L superior ramus of mandible. **Figure 4B:** Preoperative CBCT coronal slice showing #17 without cortical breakthrough on buccal or lingual surfaces. **Figure 4C:** Preoperative CBCT sagittal slice showing #17 and associated radiolucency.

The patient's medical history included hypertension and hyperlipidemia for which he took no medications. He completed his course of antibiotics and occasionally took ibuprofen for the pain. He denied any drug allergies and reported a surgical history of skin grafting to his right leg after suffering a burn.

DIFFERENTIAL DIAGNOSIS

Dentigerous Cyst

A dentigerous cyst is an odontogenic cyst that typically surrounds the crown of an unerupted or developing tooth, most often impacting the third molars or maxillary canines. It is considered the second most common type of odontogenic cyst after the periapical cyst. The cystic cavity is filled with clear or straw-colored fluid, and its presence can cause bone expansion and resorption of adjacent structures. Although usually asymptomatic, it may cause swelling or displacement of teeth. Dentigerous cysts are generally benign, but they have the potential for recurrence and may be associated with other pathologies such as neoplasms.

Odontogenic Keratocyst

The odontogenic keratocyst (OKC) is a distinctive, aggressive cyst derived from the dental lamina and known for its high recurrence rate, ranging from 16-30%. It is most commonly found in the posterior mandible, but can also occur anywhere in the upper and lower jaws. OKCs often present as painless swelling, but they can be large and expand to involve surrounding structures. Histologically, the cyst is characterized by a keratinized epithelium, which makes it distinct from other odontogenic cysts. Due to its aggressive nature, OKCs may lead to significant bone destruction and have a tendency to recur after surgical treatment.

Ameloblastoma

Ameloblastoma is a rare, locally aggressive benign tumor of odontogenic origin that arises from the epithelium involved in tooth development. Most commonly found in the mandible, especially in the molar and ramus regions, ameloblastomas often present as painless swelling or a gradual increase in jaw size. Histologically, the tumor displays a characteristic pattern of proliferating ameloblast-like cells, and it can be classified into several subtypes based on its microscopic appearance. Although benign, ameloblastomas are known for their high recurrence rate, requiring aggressive surgical removal with wide margins and often times complete resection. If left untreated, they can cause significant bone destruction and facial deformity.

DIAGNOSIS AND TREATMENT

Both patients were taken to the operating room for removal of ectopic mandibular third molars under general anesthesia with UT Oral and Maxillofacial surgery. The first patient, the 50-year-old female, was treated using an extraoral approach, while the second patient, the 45 year old male, was treated using an intraoral approach.

For the 50-year-old female patient, a nasal RAE was used for intubation. Prior to extracting the tooth, KLS hybrid arch bars were placed in the maxilla and mandible. Then, a retromandibular incision was made to allow for direct access to tooth #32 located in the superior ramus of the R mandible. The facial artery and vein were identified and ligated. Nerve monitoring was used throughout the case to prevent facial nerve damage. Dissection to the posterior border of the mandible was performed, and periosteum was then incised for access to the mandibular subcondylar region. Direct visualization of the tooth and the associated lesion was then achieved. A Stryker TPX drill with a fissure bur was used with copious irrigation to trough and section the tooth and it was removed inconsequentially.

The medial aspect of the bony cavity was noted to be intact and no fixation with plates and screws was indicated. Closure was achieved using deep Vicryl interrupted sutures and running subcuticular Monocryl sutures superficially. Prior to extubation, the patient was placed into maxilla-mandibular fixation using dental elastics. The biopsy specimen was sent for microscopic evaluation. Results returned as a chronically inflamed dentigerous cyst.

For the 45-year-old male, an oral RAE was used for intubation and the tube was secured to the patient's right. A BSSO incision was made on the lateral ramus and extended to the mesial of tooth #18 using a Bovie with a Colorado tip. Dissection superiorly up the ramus was performed using a forked ramus retractor and then held in place using an Ochsner clamp. The location of tooth #17 was identified. A TPX drill with a football bur was used with copious irrigation to expose the tooth. A curved osteotome and mallet were used to remove bone overlying the roots. A trough was then created with a fissure bur on the superior aspect of the tooth creating space for a dental elevator. The tooth was elevated and subsequently removed. The tooth and associated tissue was then placed into a container and sent for biopsy. Copious irrigation and curettage of the socket were performed. There was no indication for fixation with plates and screws intraoperatively. Closure was achieved using Vicryl sutures in a running fashion. The biopsy specimen was sent for microscopic evaluation. Results returned as an orthokeratinizing odontogenic cyst.

DISCUSSION

When managing ectopic mandibular third molars, both intraoral and extraoral surgical approaches can be employed, each with distinct advantages and considerations. The choice of approach largely depends on the position of the impacted tooth, its relationship to adjacent structures and the patient's specific clinical situation.

Intraoral Approach

The intraoral approach is considered more conservative, and typically preferred when the impacted third molar is located further anterior and inferior relative to the subcondylar region of the mandible. One advantage to this method is that it avoids external scarring and offers a more direct route for extraction. It also avoids neurovascular structures, such as CN VII and the Facial artery, that would be encountered with an extraoral approach. However, in more posterior and superiorly positioned ectopic third molars, direct visualization may not be possible with an intraoral approach. Still, with this method, care should be taken to avoid damage to the inferior alveolar nerve as it is in close proximity in this approach.

Extraoral Approach

In cases where the ectopic mandibular third molar is located in a position difficult to access via the intraoral route- such as when it is located in the posterior superior aspect of the ramus, the subcondylar region, or even in the condyle, an extraoral retromandibular approach may be required to achieve optimal access. Anatomic considerations are more complex here, as this method necessitates awareness of the facial nerve branches, major blood vessels, and the underlying musculature. Additionally, careful consideration of the joint space is needed to avoid TMJ dysfunction. While the extraoral route allows for better visibility and access in challenging cases, the disadvantage is potential facial scarring and a longer recovery time. In our case, the patient also required

prophylactic MMF to prevent a post-operative mandible fracture, which may not be necessary in every extraoral approach. Approximately

Pathology

The 50-year-old female patient was confirmed to have an inflamed dentigerous cyst which has been previously discussed. Appropriate and curative treatment was rendered at time of surgery. Recurrence rates are extremely low. For the 45-year-old male patient, a diagnosis of orthokeratinizing odontogenic cyst was made microscopically.

Orthokeratinizing odontogenic cysts (OOCs) are a rare type of developmental odontogenic cyst characterized by the presence of orthokeratinized epithelium, which differentiates them from the more common odontogenic keratocysts (OKCs) which exhibit parakeratinized epithelium. OOCs are typically less aggressive than OKCs and tend to have a better prognosis, with a lower recurrence rate. They often present as asymptomatic, slow-growing lesions that are usually discovered incidentally during routine radiographic examinations. These cysts are most commonly found in the posterior mandible and may be associated with impacted teeth. Histologically, the cystic lining shows a uniform layer of orthokeratinized squamous epithelium with a well-defined granular cell layer, distinguishing it from other odontogenic cysts. Treatment usually involves surgical enucleation, with a low likelihood of recurrence.

Treatment outcomes

Both patients were followed in clinic for a period of time post-operatively and kept on a full liquid diet. The 50-year-old female patient remained in MMF for approximately 6 weeks after surgery. Arch bars were removed after radiographic imaging confirmed the absence of a mandible fracture and noted bony fill at the extraction site (Fig 5). No complications were noted in this patient. The 45-year-old patient experienced CN V3 paresthesia post-operatively as expected, with continued improvement at each clinic visit. Post-operative imaging in this patient also confirmed the absence of mandible fracture with noted bony fill (Figure 6). In comparing the treatment approaches in both patients, the desired outcome was achieved with no major complications.

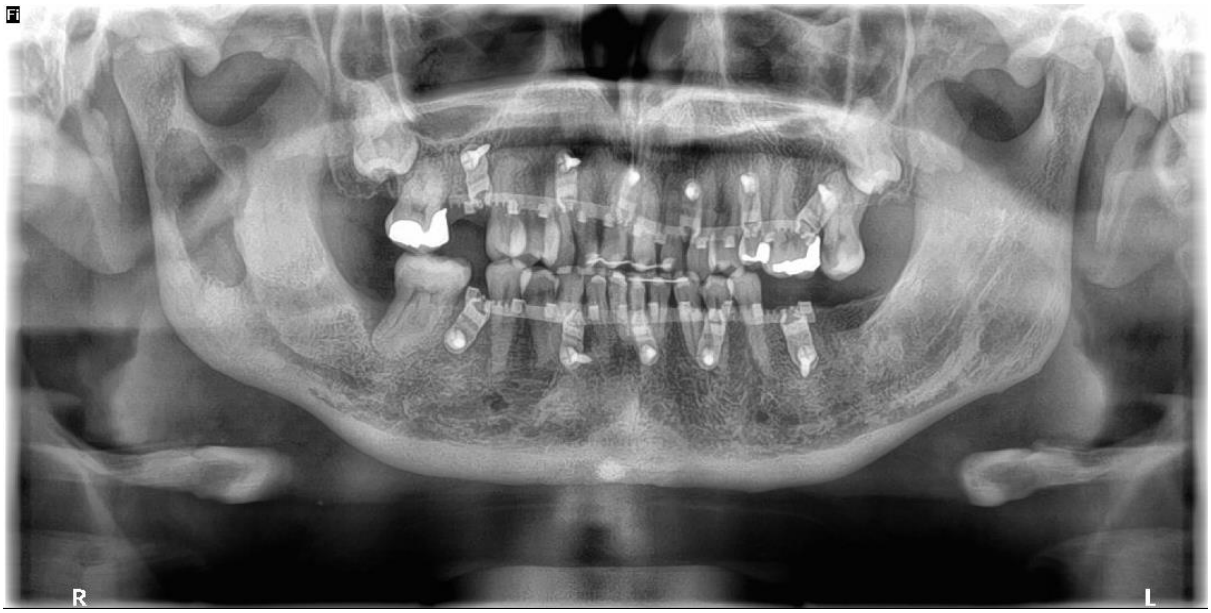

Figure 5: Post-operative panorex radiograph of 50-year-old female patient showing hybrid arch bars to maxilla and mandible as well as extraction site for tooth #32 with absence of mandible fracture and noted bony fill.

Figure 6: Post-operative panorex radiograph of 45-year-old female patient showing extraction site of tooth #17 with noted bony fill and absence of mandible fracture.

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