CASE REPORT

# Ectopic Third Molar in the Mandibular Notch

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**ABSTRACT**

Ectopic teeth are frequently found, however, ectopic lower third molars are uncommon, with obscure etiology and little described in the pertinent literature. Its location has been reported in the condylar, subcondylar, mandibular notch, angle and lower edge of the mandible. Due to the importance of therapeutic planning, adequate management and variety of clinical manifestations of this condition, this study aimed to report a clinical case of an ectopic lower third molar in the region of the mandibular notch, with increased radiolucency around the crown, in a male gender pacient, 28 years old and without symptoms. Radiographic follow-up may be indicated, however, in symptomatic patients or patients with associated pathological changes, extraction should be considered. Therefore, the treatment of choice was the extraction of tooth 38 under general anesthesia, intraorally approach, considering the dental position, radiolucency and morbidity associated with the surgery. The surrounding soft tissue was sent for anatomopathological analysis. The patient evolved uneventfully during the postoperative evaluation.

**Keywords:** Molar Third, Tooth eruption ectopic, Mandible.

## INTRODUCTION

Dental development results from a complex interaction between the oral epithelium and the underlying tissues, which begins with the formation of the dental lamina and ends with the tooth eruption[1]. Dental development occurs in three stages: bud, cap and bell. These terms describe the morphology of the tooth germ[1], represented by a set of epithelial and ectomesenchyme cells that are precursors of the tooth. An abnormal tissue interaction during this development can result in changes in the number, shape and location of the tooth germs and the formation of ectopic teeth[2]. A variety of genes manifest during tooth development. The protein Lef-1 is a critical factor in pattern formation and determining cell fate during embryonic development and is expressed for the first time in the dental epithelial thickening and during bud formation[1]. The ectopic expression of this transcription factor in the oral epithelium is related to the formation of ectopic teeth[1].

Dental ectopias consist of teeth that have developed in a region far from their normal position in the dental arch[1,3], and supernumerary, deciduous or permanent teeth may be involved[4]. The etiology of this alteration is still uncertain. However, several causes are suggested in the literature, including developmental disorders, trauma, obstructions to dentition growth, extremely dense bone, the persistence of the primary dentition, genetic factors, infections, and odontogenic cysts[1,3,5–8]. In addition, some authors suggest that they are the result of an initial deviation in the position of tooth germs[3,8] and that there is a relationship between the type of tooth involved and the anatomical region where it is found[5].

This phenomenon can occur in different locations in the oral cavity and even in other regions of the body[3]. Cases of ectopic teeth present in the maxillary sinus, condylar process, coronoid process, nasal cavity, orbit, palate and skin have been reported [9]. Ectopic dental eruptions commonly involve the maxillary first molars and mandibular lateral incisors[10]. However, despite being rare, there are reports of ectopic third molars in the coronoid process[11–15], the condylar process[2,10,16–19] and the mandibular ramus region[5,20]. Concerning ectopic lower third molars, this change may be due to a lack of space between the second molar and the ramus of the mandible[21] and a disproportion between the base of the mandible and the direction of growth of the third molars[22].

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The few reports of ectopic lower third molars found in the literature make epidemiological surveys with a preference for sex, location, signs, symptoms and ideal management difficult. However, this condition is higher in women, and the condylar area, followed by the coronoid process, notch and mandibular ramus[20]. Regarding the symptoms, it is possible to identify asymptomatic cases. However, subjects with the presence of pain, volumetric increase, fever, sinusitis, trismus, chewing difficulty and temporomandibular joint dysfunction are commonly described[4,8,15,18,23–25].

The clinical management for this abnormality remains debatable. However, four treatment options have been suggested: (1) observation when there is no evident symptomatology or pathology; (2) eliminating impaction through orthodontic intervention or removal of deciduous/permanent teeth; (3) repositioning of the ectopic tooth with the help of orthodontic or surgical therapy; (4) extraction in symptomatic cases, associated or not with pathologies and impossibility of performing the previous treatments[14].

The present case report had bioethical approval by the Research Ethics Committee, whose CAAE number 47136821.0.0000.0030 was approved under opinion number 4,758,411. This study aims to report a case of ectopic third molar in the mandibular notch region, emphasizing relevant aspects for managing this alteration and its possible etiology.

## CASE REPORT

A 28-year-old male patient sought the oral and maxillofacial surgery traumatology service to remove an ectopic tooth 38 located in the left mandibular notch region, found during routine radiographic evaluation for orthodontic treatment. During the anamnesis, the patient was asymptomatic and had no signs of extra or intraoral alterations found. Although the medical history did not provide any data relevant to the case, the patient did not report trauma or dental problems, but the change in dental alignment and the non-eruption of teeth 28 and 38. No other family member presented relevant dental or medical history.

The panoramic radiograph showed an image compatible with the inverted tooth germ of element 38, surrounded by a unilocular radiolucent area and located between the mandibular notch and the entrance of the mandibular canal (Fig 1). With this information some hypotheses were raised to diagnose hyperplastic dental follicles for the radiolucent area and ectopia for the location of the tooth germ 38. With that in perspective and with the possibility of an alteration in the pathology of the germ in the tooth 38, it was suggested the surgical removal of the tooth 38 and the dental follicle to avoid future complications such as fractures in the region and damage to adjacent nerve structures.

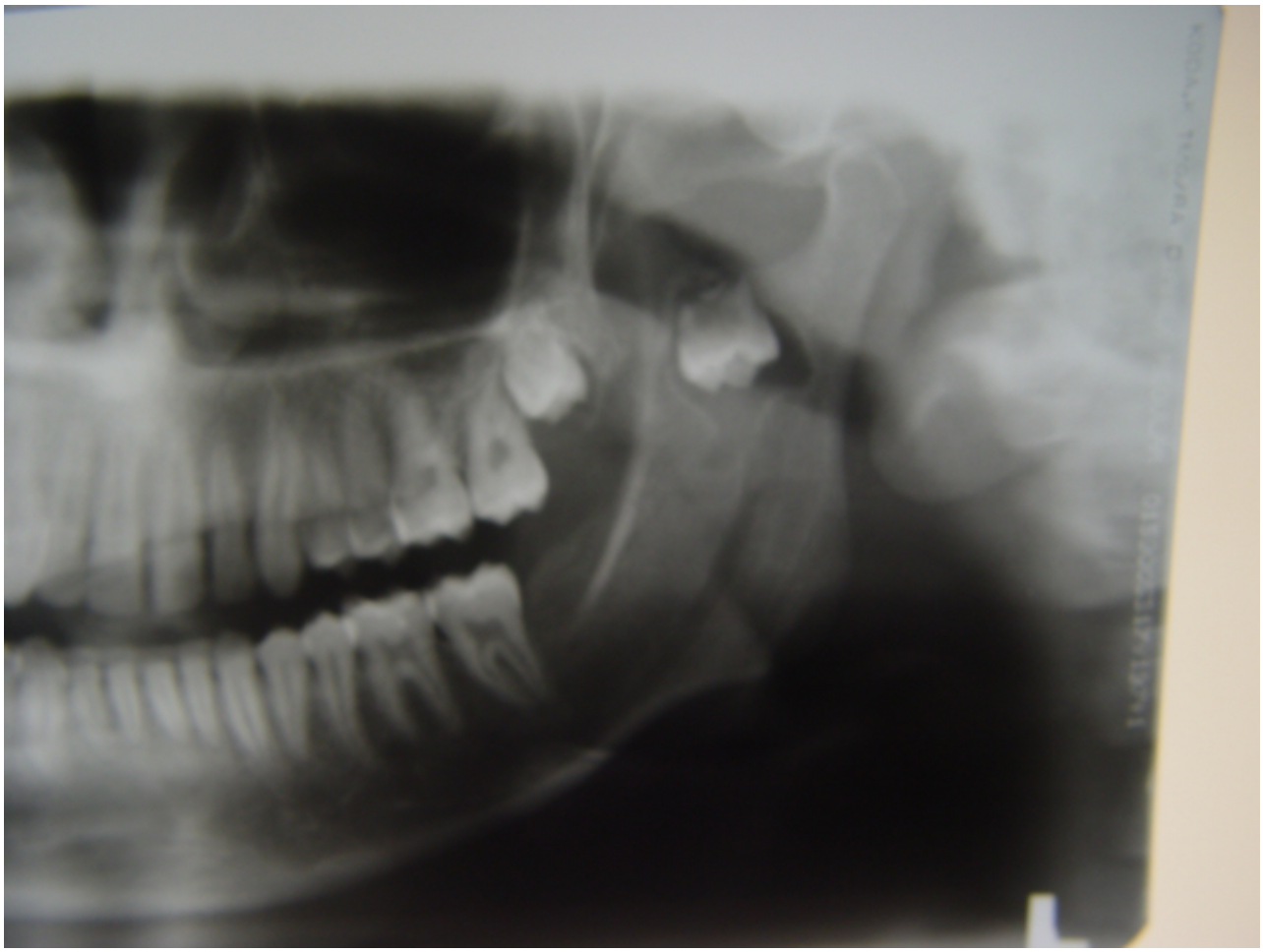

**Fig. 1:** Radiographic Exam.
Evidence in panoramic radiography of inverted tooth 38 involved a unilocular radiolucent area in the region of the mandibular notch.

Due to the difficult-to-access tooth position, radiolucency and morbidity associated with the surgery, and the patient's request, since he was very apprehensive about the proposed surgical procedure, the removal was under general anesthesia via intraoral access. A linear incision of approximately 4 cm was then made from the most superior portion of the ascending ramus of the mandible to the distal portion of tooth 37, with the detachment of the mucoperiosteal flap in the lateral portion of the mandible, exposing the ascending ramus to part of the coronoid process (Fig. 2A and B).

After moving the soft tissue in the region, the tooth can be observed, which was removed together with a soft tissue located in the pericoronal region using a Molt detacher and curved hemostatic forceps, followed by suturing (Fig. 2C, E and F). The soft tissue removed was referred for anatomopathological evaluation, and the definitive diagnosis was a hyperplastic pericoronal follicle (Fig. 3). There were no complications in the immediate postoperative period. The patient was followed up for 12 months after the procedure without complaints.

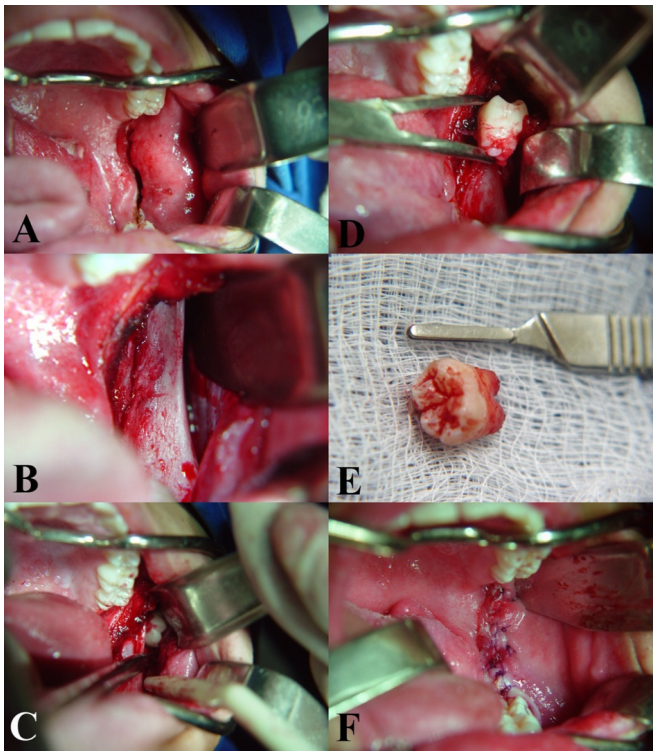


**Fig 2:** Surgical technique.
(A) Linear incision of approximately 4 cm from the most superior portion of the ascending ramus of the mandible to the distal portion of tooth 37. (B) Detachment of the mucoperiosteal flap in the lateral portion of the mandible, exposing the entire ascending ramus to part of the coronoid process. (C) Moving of soft tissue in the region where the tooth can be seen. (D) Removal of the tooth with the aid of the Molt extractor and curved hemostatic forceps. (E) Ectopic tooth element. (F) Immediate postoperative period.

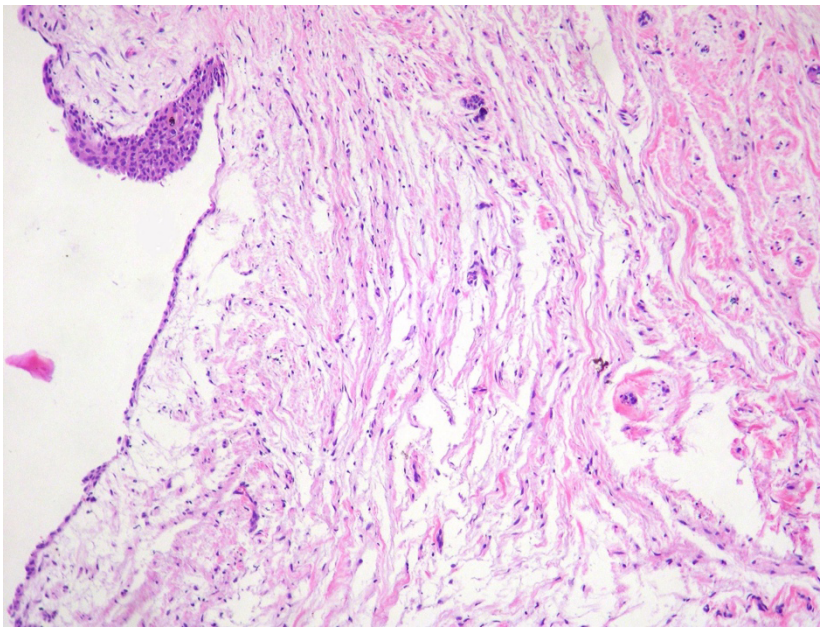

**Fig. 3:** Histopathological findings.
Histopathological aspects of the soft tissue show the presence of reduced enamel epithelium with squamous metaplasia and fibrous stroma containing numerous cords of odontogenic epithelium, which, in addition to the radiographic findings, is compatible with a hyperplastic dental follicle (Hematoxylin & Eosin, magnification of 40x the original).

## DISCUSSION

Ectopic teeth are etymologically defined as "teeth out of position" and constitute a fundamental problem for the dental professional since ectopy associated with no tooth eruption can lead to functional changes, root resorption, and cysts formation, such as the cyst dentigerous and the cyst odontogenic orthokeratinized[1–3]. Given the consequences, it is necessary to understand the process of ectopia to answer several questions about its etiology and clinical management.

Ectopic mandibular third molars were in different regions of the mandible, including the condyle, subcondyle, mandibular notch, coronoid process, ascending ramus of the mandible, and angle of the mandible and edge of the mandibular body[4]. suggested a new classification based on their anatomical locations on panoramic radiographs, making communication between health professionals more precise and more accurate. For this classification, on a panoramic radiograph or images derived from cone-beam computed tomography, four lines are drawn (a, b, c, and d) to determine four levels (I, II, III, and IV) relative to the locations of the ectopic third molars (Fig. 4). The references used to trace the lines were different: (Line a) is drawn from the occlusal plane of the mesial teeth to the ectopic third molar, as the second or first molar and the point of intersection between this line and the anterior mandibular ramus was defined as AMR (Anterior Mandibular Ramus); (Line b) is drawn in parallel to line a and extended from the tips of the roots of the second molar or, in its absence, from the roots of the first molar; (Line c) is drawn perpendicular to line b and tangential to the long axis of the distal face of the tooth mesial to the ectopic third molar; (Line d) is parallel to line c and passes through point AMR. The area delimited by the four lines was defined as the physiological region for the eruption of the third molar. Therefore, third molars that have parts within this region are defined as impacted teeth rather than ectopic teeth and are not classified according to the new classification by Wu et al[4]. For the classification by Wu et al[4] regarding the ectopic tooth's level, the mandible's most superior region includes the condylar, subcondular, coronoid and mandibular notch regions delimited by lines a and d, which corresponds to level I (Fig. 4). The region that includes the mandibular ramus, delimited by lines a, b and d, corresponds to level II (Fig. 4). The region covering the angle of the mandible, delimited by lines b and d, corresponds to level III, and the region of the mandibular body corresponds to level IV (Fig. 4). Therefore, tooth 38 was located at the level I in the present case report.

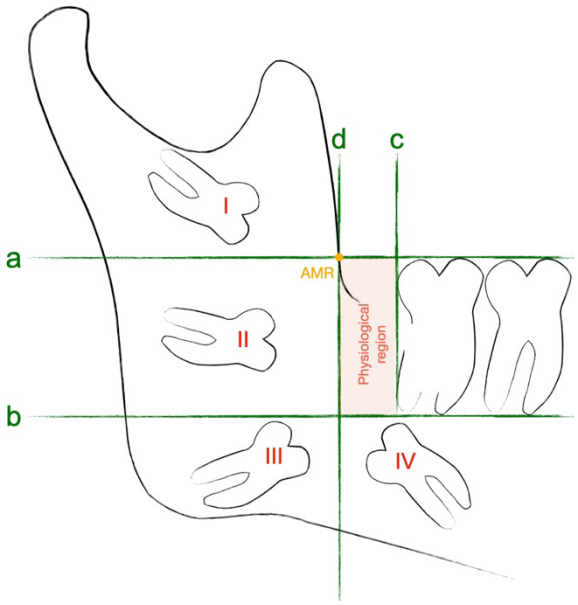


**Fig. 4:** Classification for the location in cases of ectopic lower third molars.
Line a was drawn from the occlusal plane of the teeth adjacent to the ectopic lower third molar. The AMR point was obtained from the intersection between line a and the anterior mandibular ramus. Next, line b was drawn from the tips of the roots of the second molar and parallel to line a. Next, line c was drawn perpendicular to line b and tangential to the long axis of the distal face of the tooth mesial to the ectopic third molar. Finally, line d was drawn parallel to line c and passes through point AMR. From the areas delimited by the lines, it was possible to determine the physiological region for the eruption of the third molar (delimited by the four lines) and four levels (I-IV) of ectopic locations for the mandibular third molar.

The etiology of ectopia has not yet been fully clarified, and in many cases, it cannot be identified[14]. However, it is suggested that they would result from a deviation in the position of tooth germs[3,8], with a relationship between the type of tooth involved and the anatomical region where it is found[5]. Regarding third molars, this change may be due to a lack of space between the second molar and the ramus of the mandible[21] and/or a disproportion between the base of the mandible and the direction of growth of the third molars[22].

Theories to explain the ectopic location of lower third molars include disturbances in tooth development, displacement due to pathological conditions, trauma, or iatrogenic activities[12]. The causes of this condition seem to be different and unique. However, the presence of dentigerous cysts and chronic inflammation appears to play an essential role in its appearance[15] because the pressure of the cystic fluid and the expansion caused can cause the migration of the third molar, which becomes ectopic[12]. Another theory related to the lower third molar migratory process refers to the incorporation of the tooth germ by the bone growth tissue of the coronoid process[15]. In the present case report, we observed the radiographic absence of a radiolucent tunnel, resembling an abnormal migration pathway, which is characteristic of ectopic teeth associated with pathologies such as odontogenic cysts and chronic inflammatory conditions. In addition, we obtained the histopathological diagnosis of a hyperplastic pericoronal follicle of the soft tissue surrounding the tooth 38. Thus, the etiology of ectopy in this case report is possibly more associated with a developmental disorder than pathological conditions.

Signs and symptoms that are reported in most cases of ectopic lower third molars are pain, tumor, fever, sinusitis, trismus, difficulty in chewing and dysfunction in the temporomandibular joint[8,18,23,24], since the anatomical position of the ectopic third molar seems to cause pressure and irritation of the temporal muscle fibers and the oral mucosa during chewing[5]. However, there are reports of asymptomatic patients [26] as in the present report, in which the alteration was identified by chance during a routine radiographic examination[25].

Surgical removal of ectopic third molars in the mandible must be carefully indicated and planned[16,26]. The risks of damage to nerve structures, joint components, aesthetic concerns, post-surgical reconstruction defects, and patient age must be evaluated before treatment as there is a significant increase in surgical morbidity as patients age[27]. The possibilities regarding the surgical strategies include the execution of intraoral or extraoral accesses, and the intraoral route offers enough field, avoiding the formation of extraoral scars, damage to the joint components and risk to neuronal structures, such as the facial nerve[16]. A careful preoperative strategy is of paramount importance for the safety of the procedure[28]. Magnetic resonance imaging (MRI) can be a differential for preoperative assessment of the relationship between the ectopic third molar and adjacent nerve structures to avoid iatrogenic damage to the nerves. However, there is great difficulty in accessing the MRI and the high cost of the exam. Okuyama et al.[28] through three-dimensional images using the SIMPLANT® system, were able to assess the nervous, vascular and the hard tissue pathways. Given the difficulties inherent in the extraction of an ectopic lower third molar and the risks of injury to adjacent nerves[28], initial complimentary exam, associated with three-dimensional images from computed tomography, are essential for diagnosis, preoperative assessment and surgical planning. In situations where it is impossible to perform three-dimensional evaluations, as in the present case report, panoramic radiographs are essential for the positional assessment of the ectopic third molar, to identify possible adjacent pathological lesions, and to evaluate the relationship of the proximity of the tooth to the mandibular canal. However, in cases where the panoramic radiograph does not provide sufficient information, it is possible to request other extraoral flat radiographs, such as the oblique lateral radiograph and the mandible's posteroanterior radiograph, to evaluate the relationship between the ectopic third molars and adjacent structures under different angulations, to assist in surgical planning and increase the safety of procedures.

For ectopia associated with acute inflammatory processes or cystic lesions, removal is recommended to prevent future complications such as diffuse osteolysis, deformities in the condylar process, or bone resorption[18,23]. Bruce et al.[27], related the association of odontogenic cysts, which were present in 6.7% of the cases of unerupted third molars, as an important indication for the removal of both the cyst and the tooth.

In cases without symptoms or an emergency, annual follow-up, and monitoring of the development of the lesion are recommended[16,26]. However, the possibility of secondary infections in the third molar must be considered, especially if impacted, and the possible emergence of lesions such as dentigerous cyst, orthokeratinized odontogenic cyst, odontogenic keratocyst or ameloblastomas that can cause serious complications, especially in patients with systemic disorders[29]. In the present case, the removal of the ectopic tooth and radiographic follow-up were indicated due to the non-viability of tooth eruption and the performance of histopathological evaluation to obtain the definitive diagnosis for the radiolucent area present around the tooth[5] and for the possibility of fracture of the coronoid process due to the weakening of the mandibular strength pillars due to the presence of the lesion[16].

The surgical removal method for ectopic lower third molars includes an extraoral or intraoral approach[16,18] and, more recently, an endoscopic procedure, although the latter requires specific training and instrumentation[10]. The most common approach for teeth close to the condylar process is the extraoral approach, where submandibular and preauricular techniques are performed[19]. These external accesses have the advantage of presenting a good field of vision in the trans surgical procedure. Still, they can result in aesthetic damage due to scar formation and complications such as damage to joint components, injury to the facial nerve in cases of preauricular access, or damage to the marginal branch of the seventh cranial nerve in the submandibular access[18].

The intraoral approach avoids the problems mentioned earlier but provides a small surgical field compared to the extraoral method. However, the removal of lesions in the region of the coronoid process is benefited by the intraoral approach[16,18] since there is a possibility of a larger

incision along the ascending ramus of the mandible providing sufficient access to the mandibular notch, with less likelihood of generating complications to the patient.

## CONCLUSION

In conclusion, ectopic third molars are uncommon and are usually discovered due to symptoms, clinical signs or even accidentally during routine procedures. The etiology of ectopias remains unclear, as no consensus has been reached. The leading causes are trauma, iatrogenic, infections, pathological conditions and developmental anomalies. Annual follow-up through panoramic radiographs is necessary in asymptomatic cases. However, removal of the dental element is recommended for symptomatic cases or those associated with pathological conditions. The treatment must be carefully planned according to the position of the tooth and the possible surgical sequelae of the treatment. For detailed planning in addition to panoramic radiographs, three-dimensional images may be beneficial if available. In the present report, the intraoral access was used because it is more conservative and less traumatic for the patient.

## REFERENCES


1 Nanci A. Ten Cate's Oral Histology: Development, Structure, and Function. vol. 9. 9th ed. 2017.

2 Shivashankara C, Manjunatha BS, Tanveer A. Ectopic mandibular third molar in subcondylar region: Report of a rare case. Oral Maxillofac Surg 2012;16:153–5. https://doi.org/10.1007/s10006-011-0284-7.

3 Andreasen J, Petersen J, Laskin D. Textbook And Color Atlas of Tooth Impaction: Diagnosis, Treatment And PreventionNo Title. Blackwell; 1997.

4 Wu Y, Song Y, Huang R, Hu J, He X, Wang Y, et al. Comprehensive analysis of ectopic mandibular third molar: A rare clinical entity revisited. Head Face Med 2017;13. https://doi.org/10.1186/s13005-017-0157-x.

5 Wang CC, Kok SH, Hou LT, Yang PJ, Lee JJ, Cheng SJ, et al. Ectopic mandibular third molar in the ramus region: report of a case and literature review. Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology 2008;105:155–61. https://doi.org/10.1016/j.tripleo.2007.04.009.

6 Vij R, Goel M, Batra P, Vij H, JCDR SS research:, 2015 undefined. Heterotopic tooth: an exceptional entity. NcbiNlmNihGov n.d.

7 Procacci P, Albanese M, Sancassani G, Turra M, Morandini B, Bertossi D. Ectopic mandibular third molar: report of two cases by intraoral and extraoral access. Minerva Stomatol 2011;60:383–90.

8 Fernandez MT, Terrones Meraz MA. Infected cyst in the coronoid process. Oral Surgery, Oral Med Oral Pathol 1992;73:768. https://doi.org/10.1016/0030-4220(92)-90028-O.

9 Yaseen S, Naik S, Uloopi K. Ectopic eruption - A review and case report. Contemp Clin Dent 2011;2:3. https://doi.org/10.4103/0976-237x.79289.

10 Suarez-Cunqueiro MM, Schoen R, Schramm A, Gellrich NC, Schmelzeisen R. Endoscopic approach to removal of an ectopic mandibullar third molar. Br J Oral Maxillofac Surg 2003;41:340–2. https://doi.org/10.1016/S0266-4356(03)00111-6.

11 Törenek K, Akgül HM, Bayrakdar IS. Ectopic Premolar Tooth in the Sigmoid Notch. Case Rep Dent 2016;2016:1–4. https://doi.org/10.1155/2016/6426523.

12 Chen CY, Chen YK, Wang WC, Hsu HJ. Ectopic third molar associated with a cyst in the sigmoid notch. J Dent Sci 2018;13:172–4. https://doi.org/10.1016/j.jds.2017.08.005.

13 Adachi M, Motohashi M, Nakashima M, Ehara Y, Azuma M, Muramatsu Y. Ectopic Third Molar Tooth at the Mandibular Notch. J Craniofac Surg 2015;26:e455–6. https://doi.org/10.1097/SCS.0000000000001636.

14 Wong YK. Ectopic molar near the coronoid process: Case report. 2007.

15 Hanisch M, Fröhlich LF, Kleinheinz J. Ectopic third molars in the sigmoid notch: Etiology, diagnostic imaging and treatment options. Head Face Med 2016;12:36. https://doi.org/10.1186/s13005-016-0133-x.

16 Wassouf A, Eyrich G, Lebeda R, Grätz KW. Surgical removal of a dislocated lower third molar from the condyle region: case report. Schweiz Monatsschr Zahnmed 2003;113:416–20. https://doi.org/10.5167/uzh-1568.

17 Iglesias-Martin F, Infante-Cossio P, Torres-Carranza E, Prats-Golczer VE, Garcia-Perla-Garcia A. Ectopic third molar in the mandibular condyle: A review of the literature. Med Oral Patol Oral Cir Bucal 2012;17:1013–7. https://doi.org/10.4317/medoral.17864.

18 Medici A, Raho MT, Anghinoni M. Ectopic third molar in the condylar process: Case report. Acta Biomed l'Ateneo Parm 2001;72:115–8.

19 Tümer C, Eset AE, Atabek A. Ectopic impacted mandibular third molar in the subcondylar region associated with a dentigerous cyst: A case report. Quintessence Int (Berl) 2002;33:231–3.

20 Diana C, Bodh R, Sharma P, Verma A. High lingual split access osteotomy for ectopic third molar in mandibular ramus region – A case report and literature review.

J Oral Biol Craniofacial Res 2019;9:187–9. https://doi.org/10.1016/j.jobcr.2018.06.004.

21 Capelli J. Mandibular growth and third molar impaction in extraction cases. Angle Orthod 1991;61:223–9. https://doi.org/10.1043/0003-3219(1991)061<0223:MGATMI>2.0.CO;2.

22 Richardson ME. The early developmental position of the lower third molar relative to certain jaw dimensions. Angle Orthod 1970;40:226–30. https://doi.org/10.1043/0003-3219(1970)040<0226:TEDPOT>2.0.CO;2.

23 Szerlip L. Displaced third molar with dentigerous cyst--an unusual case. J Oral Surg 1978;36:551–2.

24 Anagnostopoulou S. Ectopic third molar. Oral Surgery, Oral Med. Oral Pathol., vol. 71, Mosby; 1991, p. 522–3. https://doi.org/10.1016/0030-4220(91)90449-M.

25 Findik Y, Baykul T. Ectopic third molar in the mandibular sigmoid notch: Report of a case and literature review. J Clin Exp Dent 2015;7:e133–7. https://doi.org/10.4317/jced.51871.

26 Chongruk C. Asymptomatic ectopic impacted mandibular third molar. Oral Surgery, Oral Med. Oral Pathol., vol. 71, Oral Surg Oral Med Oral Pathol; 1991, p. 520. https://doi.org/10.1016/0030-4220(91)90446-J.

27 Bruce RA, Frederickson GC, Small GS. Age of patients and morbidity associated with mandibular third molar surgery. J Am Dent Assoc 1980;101:240–5. https://doi.org/10.14219/jada.archive.1980.0183.

28 Okuyama K, Sakamoto Y, Naruse T, Kawakita A, Yanamoto S, Furukawa K, et al. Intraoral extraction of an ectopic mandibular third molar detected in the subcondylar region without a pathological cause: A case report and literature review. Cranio - J Craniomandib Pract 2017;35:327–31. https://doi.org/10.1080/08869634.2016.1240466.

29 Burton DJ, Scheffer RB. Serratia infection in a patient with bilateral subcondylar impacted third molars and associated dentigerous cysts: Report of case. J Oral Surg (Chic) 1980;38:135–8.

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