**Critically Appraised Topic (CAT)**

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| **Project Team:**  |
| **2B-4** |
| **Project Team Participants:**  |
| **Hector Meza-Lopez, Danielle Nghiem, Jacob Des Jardins, Jacob Scholz** |
| **Clinical Question:** |
| **Are prophylactic extractions indicated for impacted teeth?** |
| **PICO Format:** |
| **P:** |
| **Patients with impacted tooth** |
| **I:** |
| **Extraction of impacted tooth** |
| **C:** |
| **No treatment** |
| **O:** |
| **Decreased effects on adjacent teeth and periodontia** |
| **PICO Formatted Question:** |
| **Would prophylactic extractions reduce the negative effects on adjacent teeth and periodontium for patients with an impacted tooth compared to no treatment?** |
| **Clinical Bottom Line:** |
| **Prophylactic extraction of the impacted tooth is indicated to prevent damage to adjacent teeth and periodontal health.** |
| **Date(s) of Search:**  |
| **10/9/2020** |
| **Database(s) Used:** |
| **PubMed.gov** |
| **Search Strategy/Keywords:** |
| **Impacted tooth, root resorption, extraction** |
| **MESH terms used:** |
| **“Cuspid,” “tooth eruption, ectopic”, “tooth, impacted”, “root resorption”** |
| **Article(s) Cited:** |
| 1. Bertl MH, Frey C, Bertl K, Giannis K, Gahleitner A, Strbac GD. Impacted and transmigrated mandibular canines: an analysis of 3D radiographic imaging data. Clin Oral Investig. 2018 Jul;22(6):2389-2399. doi: 10.1007/s00784-018-2342-0. Epub 2018 Feb 1. PMID: 29392413.
2. Ghaeminia H, Perry J, Nienhuijs ME, Toedtling V, Tummers M, Hoppenreijs TJ, Van der Sanden WJ, Mettes TG. Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth. Cochrane Database Syst Rev. 2016 Aug 31;(8):CD003879. doi: 10.1002/14651858.CD003879.pub4. Update in: Cochrane Database Syst Rev. 2020 May 4;5:CD003879. PMID: 27578151.
3. Grisar K, Piccart F, Al-Rimawi AS, Basso I, Politis C, Jacobs R. Three-dimensional position of impacted maxillary canines: Prevalence, associated pathology and introduction to a new classification system. Clin Exp Dent Res. 2019 Feb;5(1):19-25. doi: 10.1002/cre2.151. Epub 2018 Dec 19. PMID: 31943949.
4. Sarica I, Derindag G, Kurtuldu E, Naralan ME, Caglayan F. A retrospective study: Do all impacted teeth cause pathology? Niger J Clin Pract. 2019 Apr;22(4):527-533. doi: 10.4103/njcp.njcp\_563\_18. PMID: 30975958.
5. Staderini E, Patini R, Guglielmi F, Camodeca A, Gallenzi P. How to Manage Impacted Third Molars: Germectomy or Delayed Removal? A Systematic Literature Review. Medicina (Kaunas). 2019 Mar 26;55(3):79. doi: 10.3390/medicina55030079. PMID: 30917605; PMCID: PMC6473914.
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| **Study Design(s):** |
| 1. Retrospective cross-sectional study
2. **Systematic review of RCT’s**
3. **Retrospective cross-sectional study**
4. **Retrospective cross-sectional study**
5. **Systematic review of RCT’s**
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| **Reason for Article Selection:** |
| 1. The study answers part of the PICO question; the observed results of no treatment to impacted teeth. In particular, the patient in question has an impacted mandibular canine.
2. The study answers the PICO question. It focuses on third molars, a commonly impacted tooth.
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| **Article(s) Synopsis:** |
| 1. Method: CT/CBCT of 99 patients with 94 impacted mandibular canines were studied for their location, morphology, neighboring structures, anomalies, and influence on transmigration.

Results: 40.4% of impacted mandibular canines led to transmigration, where the canines were apically located and more horizontally angulated. There was a 7.3% incidence of root resorptions of adjacent teeth and was even higher for lingually impacted canines. **Conclusion: root resorption of adjacent teeth and transmigration are associated with impacted mandibular canines.**1. **Method: A systematic review was performed to evaluate studies comparing removal with retention of asymptomatic disease-free impacted wisdom teeth in adolescents or adults. Eight review authors conducted the assessments independently.**

**Results: Two studies were included. Only low to very low quality evidence was found in one study that suggested that no treatment may be associated with increased risk of periodontitis affecting the adjacent second molar in the long term. Another study was at high risk of bias and suggested that extraction has aclinically significant effect on deminsional changes in the dental arch.** **Conclusion: There was insufficient evidence to determine whether asymptomatic disease-free impacted wisdom teeth should be extracted. Some evidence suggested that retention is associated with increased risk of periodontitis in the long term but it was of low-quality. High quality long term propspective cohort studies may provide better evidence in the future. Patient values should be considered and clinical expertise used to guide shared decision making with patients. If the decision is no treatment, regular clinical assessments should be conducted.** 1. **Method: CBCT imaging of the maxilla taken between 2012 and 2016 was screened for impacted maxillary canines. The canines were assessed for location, possible root anomalies, ankylosis, and ectopic position.**

**Results: 130 patients were identified with 162 impacted canines. Dilaceration of the root occurred in 17.9% cases and resorption of neighboring teeth in 14.8%, with most being the lateral incisor. 6.8% of the impacted maxillary canines were ankylosed.** **Conclusion: planning for impacted maxillary canine treatment should be based on 3D imaging. Creating and using a standardized classification system to aid in identifying complicated cases is indicated.**1. **Method: 608 CBCT images of patients evaluated retrospectively. The impacted tooth entity was evaluated first, then relations of the tooth and anatomical structures and pathologies caused by the impacted tooth. They were examined by three observers with at least 3 years experience with CBCT, with any conflict in reviews resolved by an observer with 10 years of experience with CBCT.**

**Results: 209 of the 608 patients had impacted teeth, with a total of 394 impacted teeth. 44.4% of the impacted teeth caused periodontal bone loss. 33.3% caused resorption in the adjacent teeth, 8.6% caused cysts or tumors, and 2.3% caused decay lesions in the adjacvent teeth.****Conclusion: Impacted teeth are relatively prevalent and oftentimes cause pathology. The impacted teeth may be controlled if they do not cause pathology; CBCT can be used to assess suspected cases.**1. **Method: literature search done to evaluate and compare risks and benefects of germectomy (extraction of a tooth that had formed 1/3 or less of its root) and delayed removal of third molars**

**Results: 1610 articles were screened, and 4 articles were included in the review. Three studies were considered with medium bias risk and one at high risk. A quantitative analysis was not possible due to hetergenity of results and low number of included studies; only qualitative analysis was made. No sufficient evidence to state the benefits of preventive removal of impacted theird molars.****Conclusion: There is a need to provide an ethical-based comprehensive approach in the diagnostic workflow and the assessment of treatment outcome** |
| **Levels of Evidence:** (For Therapy/Prevention, Etiology/Harm) See <http://www.cebm.net/index.aspx?o=1025>[x]  **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)[ ]  **1b** – Individual RCT[ ]  **2a** – Systematic Review of Cohort Studies[ ]  **2b** – Individual Cohort Study[ ]  **3** – Cross-sectional Studies, Ecologic Studies, “Outcomes” Research[ ]  **4a** – Systematic Review of Case Control Studies[ ]  **4b** – Individual Case Control Study[ ]  **5** – Case Series, Case Reports[ ]  **6** – Expert Opinion without explicit critical appraisal, Narrative Review[ ]  **7** – Animal Research[ ]  **8** – In Vitro Research |
| **Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews**See article **J Evid Base Dent Pract 2007;147-150**[ ]  **A** – Consistent, good quality patient oriented evidence[x]  **B** – Inconsistent or limited quality patient oriented evidence[ ]  **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening |
| **Conclusion(s):** |
| **More research is needed to help create an algorithm for planning impacted teeth. Prophylactic extraction of impacted teeth may be indicated to prevent damage to adjacent teeth and periodontal bone loss. Should the impacted tooth remain, CBCT/3D imaging is advised to continually monitor the tooth and surrounding periodontia.** |