



Abstract

Purpose: The purpose of this study was to review the literature on bifid mandibular canals (BMC) in pediatric patients and present panoramic radiographs of children with BMC.

Method: Medical subject headings (MeSH) were generated and used to conduct PubMed®/MEDLINE literature search on BMC. After initial abstract review, articles meeting the selection criteria were reviewed. Additionally, panoramic radiographs from children with unilateral or bilateral BMC were discussed.

Results: The literature search revealed BMC prevalence of 0.04-30% and 15.6-65% in adults using panoramic and cone beam computed tomographic (CBCT) images, respectively. The prevalence of BMC in children was 43.0% using CBCT images. The most common type of BMC was retromolar canal (11.1%); whereas, commonly reported clinical implication of BMC was failure to achieve adequate inferior alveolar nerve block.

Conclusion: Although limited, routine panoramic radiographs are diagnostic for BMC in children and such a finding should be considered during restorative-surgical care.

Background

- Bifid mandibular canals (BMC) were described by anatomical dissection in 1977 and first identified on panoramic radiograph by Kiersch and Jordan in 1973.
- There is no documented evidence of BMC using panoramic radiographs in young children during mixed dentition stage.
- The main aim of this study was to systematically review the literature to find prevalence of BMC in adult and pediatric population and report clinical relevance of the finding.

Methods

- Medical subject headings (MeSH) were generated and used to conduct PubMed®/MEDLINE literature search on BMC using terms such as bifid mandibular canal, perimandibular neurovascularization, retromolar canal, and accessory mandibular foramen.
- After initial search, 247 articles were identified, and XX articles were shortlisted after abstract review.
- Systematic review of all the shortlisted articles was performed to note BMC and associated findings.
- Only one article reported BMC prevalence in children and hence, meta-analysis was not possible.
- Panoramic radiographs of two children with BMC are also reported.

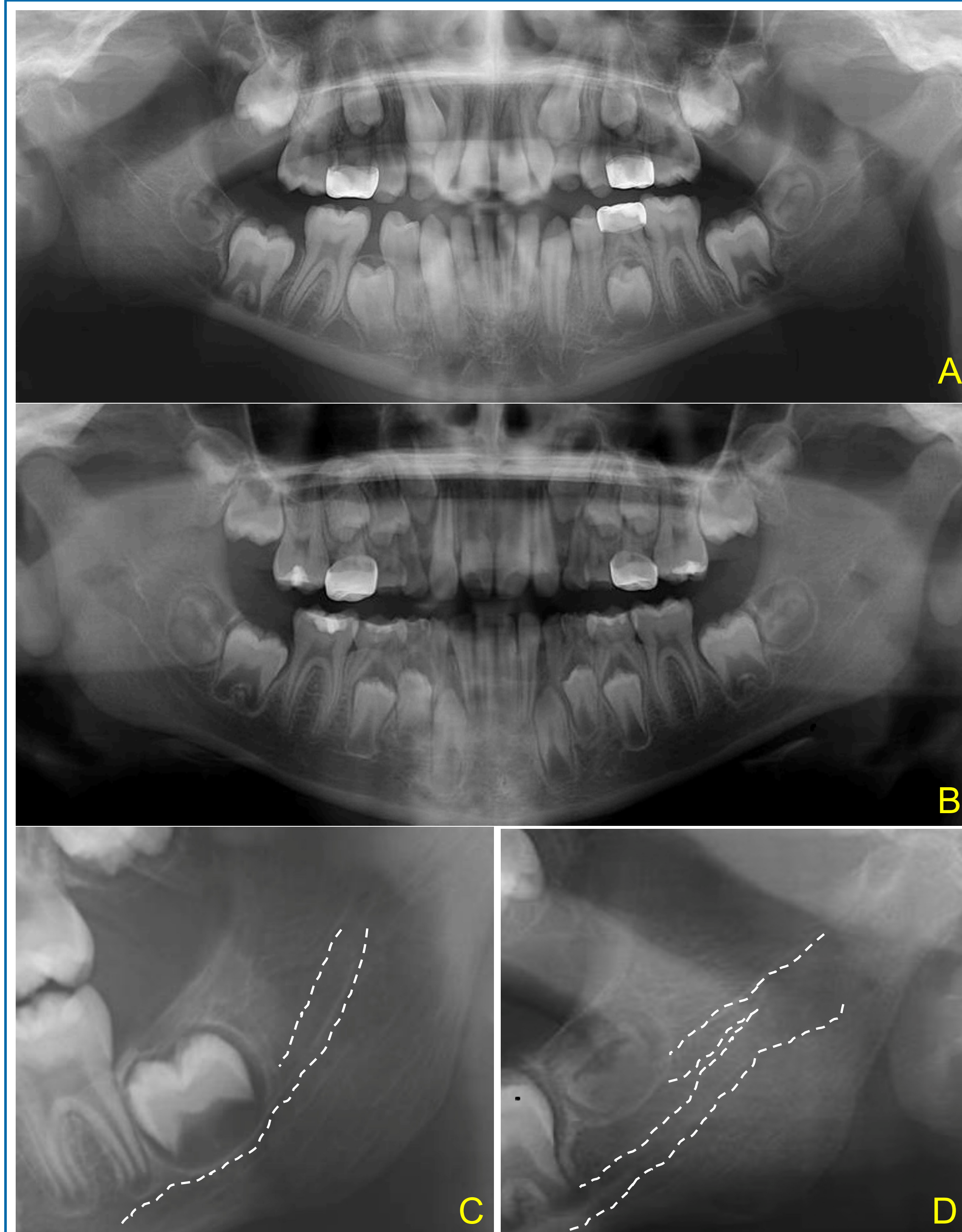


Figure: Panoramic radiographic images of two children with bilateral BMC (A) or unilateral BMC (B). Cropped images of the mandible and ramus area demonstrating normal inferior alveolar nerve canal and course (C) and BMC (D).

Results

- Prevalence of BMC in adults was reported to be 0.04-30.6%, 15.6-65%, and 17.4% using panoramic image, computed tomographic (CBCT) images, and cadaveric mandibles, respectively.
- The prevalence of BMC in Turkish children using CBCT was 42.8%.
- Age, sex, and ethnic variations were common in BMC prevalence and associated findings.

Discussion

- During embryonic development three inferior alveolar nerves exist.
- They fuse later to form a single inferior alveolar nerve and incomplete fusion results in BMC.
- Detection of BMC on panoramic radiographic can be challenging due to two-dimensional image.
- False positive BMC finding could be due to presence of mylohyoid groove formed by impression of mylohyoid nerve on medial surface of mandible, insertion of Mylohyoid muscle on Mylohyoid line, osteocondensation pattern of bone, and lingual vascular canal.
- Presence of BMC could lead to failure of inferior alveolar nerve block and complications during surgical procedures including traumatic neuroma, paresthesia, uncontrolled bleeding etc.
- Additional complications could be evident during orthognathic procedures, fracture reduction and possible pain-discomfort associated with mandibular prosthesis.
- There is limited data in the literature regarding presence of Bifid mandibular canals in children.

Conclusion

- Although limited, routine panoramic radiographs can be diagnostic for detection of BMC in children.
- Identification of BMC should be appropriately documented for effective inferior alveolar nerve block and restorative-surgical management in children.

References

- Castro MA. World J Radiol. 2015 Dec 28;7(12):531-7.
- Orhan AI *et. al.*, J Craniofac Surg. 2013 Jul;24(4):e365-9
- Langlais RP *et. al.*, J Am Dent Assoc. 1985 Jun;110(6):923-6.
- Additional references available upon request.