

Five-Rooted Maxillary Third Molar Encountered During Routine Extraction: A Rare Anatomical Variation with Surgical Implications

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Abstract

Maxillary third molars exhibit considerable anatomical variability, particularly in root morphology. The presence of five completely separated roots is exceptionally uncommon and may increase the difficulty and risk associated with extraction. This case report describes the atraumatic extraction of a five-rooted maxillary third molar in a 30-year-old medically healthy male. The patient presented with intermittent pain associated with the left mandibular third molar, for which surgical extraction was indicated. The opposing maxillary third molar was planned for prophylactic removal to prevent future supra-eruption. Panoramic radiography did not reveal an obvious abnormal root configuration. During extraction, however, marked resistance was encountered despite adequate access and routine luxation. Excessive force was avoided, and controlled buccopalatal and rotational movements were used with appropriate support of the surrounding alveolar bone. The tooth was subsequently removed atraumatically and was found to possess five completely separated, well-developed divergent roots. Healing was uneventful, with no postoperative complications. The case emphasizes that unexpected resistance during extraction may indicate complex root anatomy and should prompt modification of surgical technique rather than the application of excessive force.

Keywords: Maxillary Third Molar, Five-Rooted Molar, Root Morphology, Anatomical Variation, Tooth Extraction, Oral Surgery

1. Introduction

Third molars exhibit marked anatomical variability among permanent teeth with respect to eruption pattern, crown morphology, and root configuration [1]. Maxillary third molars commonly possess three roots; however, fused, single, four-rooted, and accessory-rooted forms have also been reported [3, 4]. These anatomical variations may complicate extraction by increasing mechanical retention, limiting the path of removal, and predisposing the patient to complications such as root fracture, maxillary tuberosity fracture, and oroantral communication [1].

Accessory roots are believed to arise from developmental alterations involving Hertwig's epithelial root sheath [5]. Reports based on cone-beam computed tomography have indicated that five-rooted maxillary third molars are exceptionally rare [4]. Conventional panoramic radiographs may fail to demonstrate complex root morphology because of superimposition, making unexpected resistance during extraction an

important clinical indicator [6]. This report describes the successful extraction of a five-rooted maxillary third molar and discusses the surgical implications of this unusual anatomical variation.

2. Case Report

A 30-year-old medically healthy male presented with intermittent pain associated with the left mandibular third molar (FDI 38). Clinical examination revealed a partially erupted tooth with localized tenderness, and panoramic radiography confirmed the need for surgical extraction. The opposing maxillary third molar (FDI 28) appeared fully erupted without any obvious radiographic abnormality. To prevent future supra-eruption, prophylactic extraction of the maxillary third molar was planned following removal of the mandibular antagonist.

After obtaining written informed consent, the mandibular third molar was surgically removed without complications. Attention was then directed to the maxillary third molar. Local anaesthesia was administered using posterior superior alveolar and greater palatine nerve blocks, followed by reflection of a conservative full-thickness mucoperiosteal flap to improve access. Initial luxation was performed using straight and curved Warwick James elevators. Despite adequate access and a favourable radiographic appearance, the tooth demonstrated marked resistance with minimal mobility.

Figure 1. Preoperative Panoramic Radiograph Demonstrating the Mandibular Left Third Molar Requiring Surgical Extraction and the Opposing Maxillary Left Third Molar. No Obvious Accessory Root Morphology Is Evident on the Panoramic Image.



The unexpected resistance suggested the presence of complex root anatomy. Excessive force and aggressive instrumentation were deliberately avoided to reduce the risk of root fracture, maxillary tuberosity fracture, oroantral communication, or displacement of the tooth into adjacent anatomical spaces. Progressive luxation was continued using controlled buccopalatal and rotational movements with maxillary third molar forceps while supporting the surrounding alveolar bone. After approximately 20 minutes, the tooth was delivered atraumatically.

The extraction socket showed no evidence of oroantral communication, excessive bleeding, or injury to surrounding tissues. Examination of the extracted tooth revealed five completely separated, well-

developed divergent roots, explaining the unusual intraoperative resistance. Retrospective evaluation of the panoramic radiograph confirmed that the accessory roots had been obscured by image superimposition. The socket was irrigated and closed with 3-0 black silk sutures. Healing was uneventful, and the patient remained asymptomatic at one-week follow-up.

Figure 2. Clinical View During Surgical Extraction of the Maxillary Third Molar.



Figure 3. Radiographic Views of the Maxillary Third Molar Demonstrating the Limited Visualization of Complex Root Morphology on Conventional Imaging.

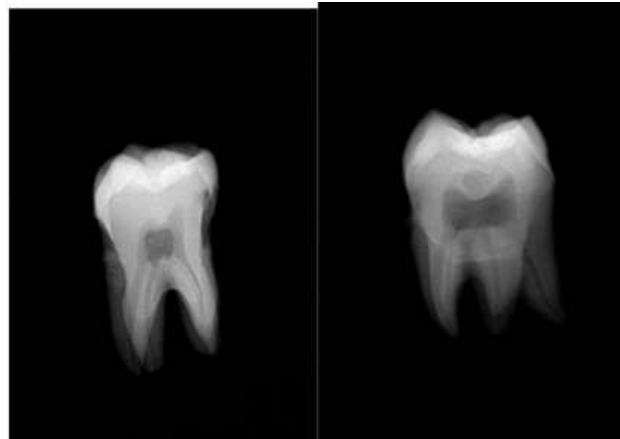


Figure 4. Mesial and Distal Aspects of the Extracted Tooth Illustrating the Divergent Accessory Roots.



Figure 5. Palatal Aspect of the Extracted Tooth Demonstrating Root Morphology From an Alternative Perspective.



Figure 6. Apical View Highlighting the Spatial Arrangement of the Five Independent Roots.



Discussion

Maxillary third molars demonstrate considerable anatomical variation, with three roots representing the usual morphology [4]. The presence of five completely separated roots is extremely uncommon and is thought to be associated with developmental alterations of Hertwig's epithelial root sheath [5]. Such anatomical variations have important surgical implications because divergent accessory roots may increase mechanical retention within the alveolar bone, making luxation more difficult and prolonging extraction [1].

Complex root morphology may increase the likelihood of complications including root fracture, maxillary tuberosity fracture, oroantral communication, and displacement of the tooth or root fragments into adjacent anatomical spaces [1]. Consequently, clinicians should suspect unusual anatomy when resistance encountered during extraction is inconsistent with the radiographic findings. In such situations, controlled

force, gradual rotational movements, and adequate support of the surrounding bone are preferable to forceful instrumentation [1]. Where uncertainty exists, selective tooth sectioning or appropriate three-dimensional imaging may help in surgical planning [6].

This case also highlights the limitations of panoramic radiography in detecting accessory roots. Superimposition of anatomical structures may mask complex root morphology, leading to underestimation of extraction difficulty [4, 6]. Although CBCT is not routinely indicated for every third molar extraction, three-dimensional imaging may be considered when conventional radiographs are inconclusive or when clinical findings do not correspond with the radiographic appearance [6].

Reports describing the surgical management of five-rooted maxillary third molars remain scarce [4]. The present case emphasizes that careful intraoperative assessment, recognition of unexpected resistance, and timely modification of surgical technique can facilitate atraumatic extraction while minimizing complications [1].

Conclusion

Five-rooted maxillary third molars represent an exceptionally rare anatomical variation that may significantly increase extraction difficulty [4]. Conventional panoramic radiography may fail to identify complex root morphology because of image superimposition [6]. When unexpected resistance is encountered during extraction, clinicians should consider the possibility of accessory roots and modify the surgical approach rather than applying excessive force [1]. Thorough anatomical knowledge, careful intraoperative judgment, and meticulous surgical technique are essential for preventing complications and achieving predictable clinical outcomes.

References

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