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Two-stage orthodontic extraction for impacted third molar deep to the mandible inferior border caused by giant odontoma

KEYWORDS
Impacted tooth;
Lower third molar;
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The extraction of deep-impacted third molars is a significant challenge for clinicians, mainly due to the risk of inferior alveolar nerve (IAN) injury, which can result in permanent nerve disturbances (0.4%–23%).[1] This risk is further heightened when molars are deeply impacted and near the mandibular angle or inferior border due to cysts, tumors, or other factors.[2] Common surgical approaches, such as the traditional intraoral buccal corticotomy method or sagittal split osteotomy, may lead to buccal cortex loss or impact occlusion and affect the postoperative diet. In addition, an extraoral approach, while an alternative, carries the risk of facial nerve injury and visible scarring.[3] The methods mentioned above have not been shown to reduce the risk of IAN injury.

This article introduces a two-stage orthodontic extraction technique applied for the treatment of a giant odontoma-associated mandibular angle-impacted third molar with the aim of reducing the risk of IAN injury and allowing for bone preservation.

An 18-year-old male patient with a generally good systemic condition presented with a giant odontoma and a left impacted third molar located deep to the mandibular inferior border (Fig. 1A). Cone-beam computed tomography (CBCT) revealed the proximity of tooth 38 to the left IAN (Fig. 1B, C, D).

The first surgery, conducted on July 30, 2022, involved creating an approximately 2 × 1.5 cm^2 window in the retromolar area for giant odontoma excision (Fig. 1E). Following odontoma removal, tooth 38 was exposed, and a bone screw was placed on its crown (Fig. 1F). Orthodontic forces were applied using a combination of wires and elastic bands connecting tooth 38 to bone screws placed between teeth 34 and 35 (Fig. 1G). Postoperatively, after one month, panoramic and CBCT images showed approximately 2 mm of forward movement of tooth 38, effectively distancing it from the left IAN (Fig. 1H and I).

The second surgery, performed on August 22, 2022, the tooth was not only displaced but also loosened due to the orthodontic force, making it very easy to extract (Fig. 1J and K), and the bone defect was filled with particulate marrow cancellous bone obtained from the right iliac crest (Fig. 1L and M). The patient exhibited excellent wound healing one year after surgery (Fig. 1Q), and follow-up imaging indicated successful bone regeneration of the left mandibular angle with no evidence of lip numbness (Fig. 1N, O, P).

This innovative method loosens the deeply impacted tooth for easier extraction, eliminates the need for extensive bone removal, preserves mandible continuity, allows for more straightforward reconstruction, and does not impact occlusion or result in visible external scars.[4] Most importantly, it reduces the risk of IAN injury.[5] This method has several limitations. First, the treatment outcomes are less predictable, and tooth movement is not guaranteed. Additionally, a second operation is required with extended treatment duration.[5]

In conclusion, two-stage orthodontic extraction has emerged as a promising alternative for addressing deeply impacted third molars near the mandibular angle or inferior border. This technique successfully mitigates the risk of IAN injury while preserving mandibular integrity and minimizing postoperative complications.

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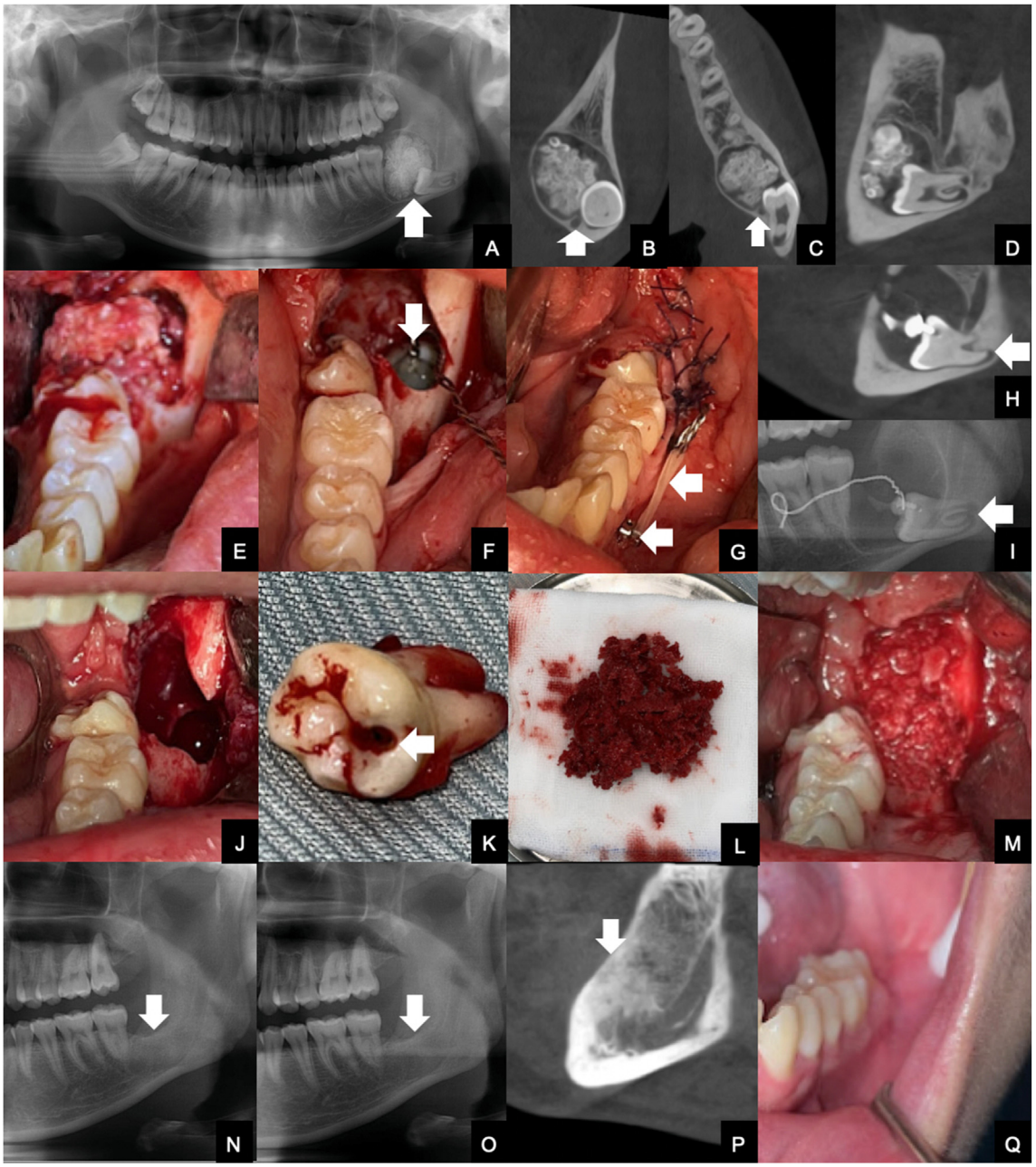

Figure 1 Radiographic and clinical photographs of our case. (A) Panoramic radiograph exhibited a giant odontoma and a left impacted third molar located deep to the mandibular inferior border (arrow). (B) A coronal view of CBCT images revealed the proximity of tooth 38 to the left IAN canal (arrow). (C) An axial view of CBCT images revealed the proximity of tooth 38 to the left IAN canal (arrow). (D) Sagittal view of CBCT images. (E) The bone window in the retromolar area was created for excision of the giant odontoma. (F) The bone screw (arrow) was placed on the occlusal surface of tooth 38. (G) Orthodontic forces were applied by an elastic band (arrow) connecting to the bone screw between 34 and 35 (arrow) to make tooth 38 move forward. (H) A CBCT image showed approximately 2-mm forward movement of tooth 38 (arrow). (I) The panoramic radiograph also showed approximately 2-mm forward movement of tooth 38 (arrow). (J) A clinical photograph showed tooth 38 extracted. (K) A screw hole (arrow) was placed into the occlusal surface of tooth 38. (L) The particulate marrow cancellous bone was obtained from the right iliac crest. (M) The bone defect was filled with particulate marrow cancellous bone. (N) The follow-up image of 8 months after surgery indicated successful bone regeneration (arrow). (O) One year after surgery, the follow-up panoramic film indicated stable bone volume (arrow). (P) One year after surgery, the follow-up CBCT images indicated stable bone volume (arrow). (Q) One year after surgery, the clinical photograph showed good wound healing.

Declaration of competing interests

The authors have no conflicts of interest relevant to this article.

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Wei-Chen Huang
Sheng-Hong Wang
Kai-Yuan Hsiao
Division of Oral and Maxillofacial Surgery, Department of Stomatology, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan

Ken-chung Chen*
Division of Oral and Maxillofacial Surgery, Department of Stomatology, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan
Institute of Oral Medicine, College of Medicine, National Cheng Kung University, Tainan, Taiwan
School of Dentistry, College of Medicine, National Cheng Kung University, Tainan, Taiwan

*Corresponding author. Division of Oral and Maxillofacial Surgery, Department of stomatology, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan. No.1, University Road, Tainan, 701401, Taiwan
E-mail address: omsknight@gs.ncku.edu.tw (K.-c. Chen)

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