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Surgery of impacted maxillary second premolar beneath first molar trifurcation via lateral window maxillary sinus augmentation: A case report

The maxillary second premolar impacted under the first molar trifurcation is exceptionally rare. It should be removed if it causes crown or root resorption of adjacent teeth. We reported a case of such condition in a teen, the impacted premolar was successfully treated with lateral window maxillary sinus augmentation (LWMSA).

A 12-year-old male was referred to our outpatient department for a missing tooth 15. Clinical examination revealed a well-aligned dental arch with occlusal function and vital, asymptomatic teeth 16 and 14. The cone-beam computed tomography (CBCT) revealed an impacted tooth 15 between the radicular furcation of the tooth 16 with signs of external resorption at the palatal root apex of the tooth 14 (Fig. 1B). The patient's parents were anxious about the prognosis of the tooth 14 and requested extraction of the tooth 15, along with extraction socket and sinus lateral wall reconstruction. To avoid disturbing the greater palatine artery and the roots of the tooth 16 or 14, extraction of the tooth 15 through LWMSA was recommended. After obtaining informed consent, the procedure was performed under general anesthesia. A rectangular flap was reflected from the tooth 13 to 17, and a 20 × 15 mm bone window was created 3 mm above the root apex of the tooth 16. The Schneiderian membrane was carefully reflected (Fig. 1C). After removing the dome-shaped cortical bone covering the tooth 15, the impacted tooth and follicular tissue were completely removed (Fig. 1D). The socket and sinus augmentation, along with lateral wall reconstruction, was performed using incremental placements of bone graft (Fig. 1D and E). The bone window was covered with a resorbable membrane, with the mucosal flap sutured back to its original position, achieving primary closure. The 6-month follow-up showed no complications, with the tooth 16 remaining vital and asymptomatic. CBCT showed the overall good sinus floor and wall regeneration, with a radiolucent area at the bottom of the socket (Fig. 1F). The patient is scheduled for the regular follow-ups every 6 months.

Removal of the tooth 15 impacted between the trifurcation of the tooth 16 has been reported using a transantral approach without reconstructing bony sinus wall.[1] Although a successful extraction surgery, post-operative status of bony sinus wall was not mentioned, and the lack of which could lead to future anatomical structure violations. The LWMSA technique is commonly used in preprosthetic implant surgery for adults but has seldom been reported in teenagers,[2] while reconstruction of alveolar clefts using bone grafts in 8-to-10-year-old patients is well-documented.[3] The LWMSA approach for the maxillary root-end surgery has been successfully tested in adults.[4] Supported by the previously mentioned literature, our case is the first to use the LWMSA for surgery of an impacted tooth 15 located beneath the tooth 16 trifurcation.

The CBCT at the 6-month follow-up revealed a radiolucent area at the coronal part of the extraction socket. Park et al. reported a similar condition within 6 months of LWMSA for dental implant; histopathologic examination revealed that such radiolucent area contained the dense fibrotic tissue without inflammatory tissue or ciliated epithelial cells.[5] We believe the radiolucent area in our case is also composed of the scar tissue. The bone graft provided good radiographic bone fill with minimal voids.

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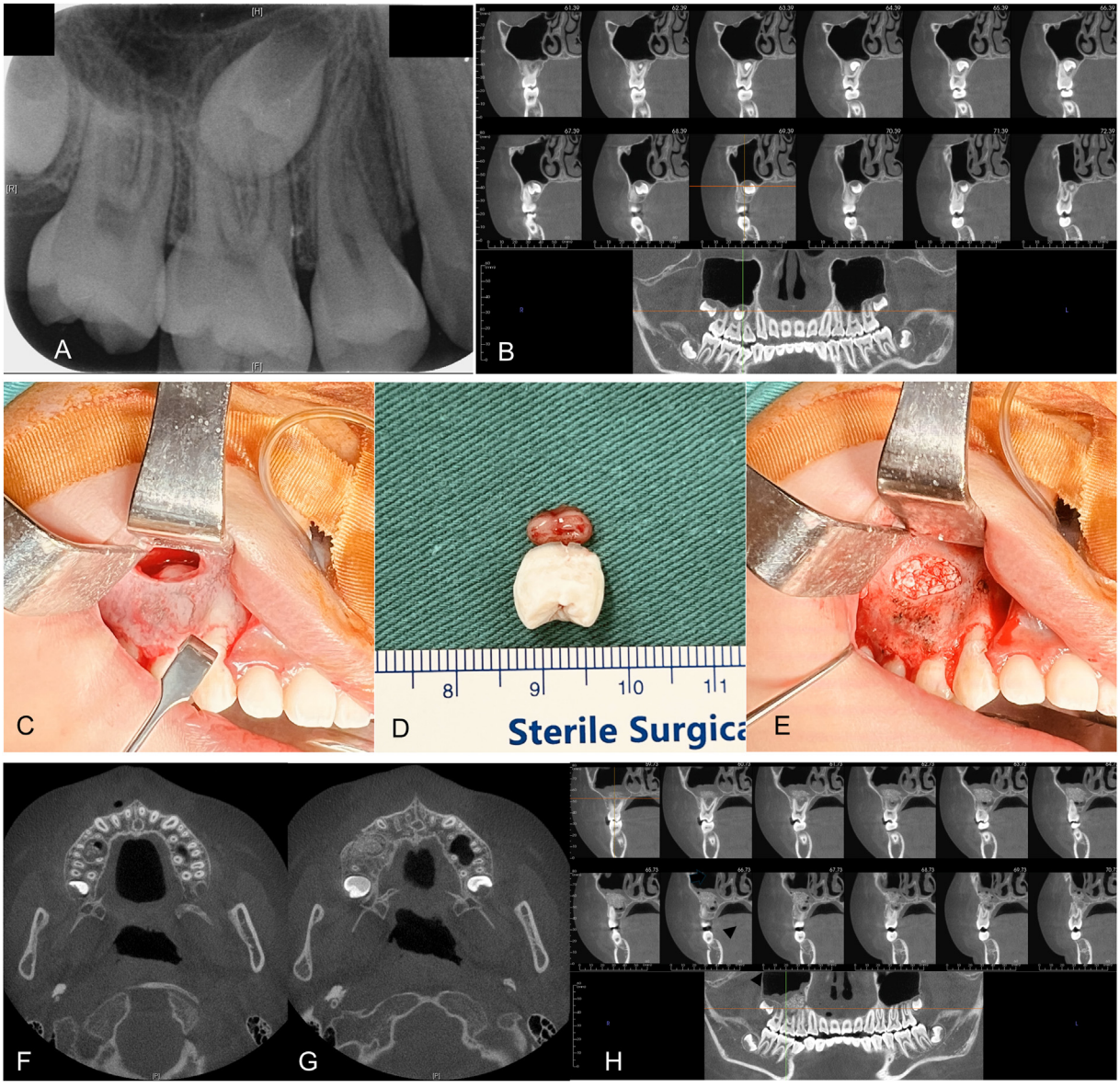

Figure 1 Photographs of our 12-year-old male patient with a right maxillary second premolar (tooth 15) impacted between radicular furcation of the right maxillary first premolar and first molar (teeth 14 and 16), depicting radiographic findings, surgical procedures, and radiographic post-surgical and follow-up findings. (A) Periapical radiography showing the coronal part of tooth 15 superimposed with the root of the tooth 16. The root of the tooth 14 was curved mesially. (B) Pre-surgical CBCT showing the coronal part of the tooth 15 impacted between the radicular furcation of the tooth 16, while the palatal root of the tooth 14 showed external resorption at its apex. (C) During the surgery, 20 × 15 mm bone window 3 mm over the root apex of the tooth 16 was created. Schneiderian membrane was reflected, revealing dune-shaped cortical bone covering the tooth 15. (D) The impacted tooth 15 and follicular tissue were removed, measuring about 9 × 9 × 5 mm in size. (E) The socket and sinus wall augmentation was done with incremental compaction of 2 bottles of 1.5 ml deproteinized bovine bone (Large Geistlich Bio-Oss® granules, Geistlich Pharma, Wolhusen, Switzerland). The bone window was then covered with a cross-linked collagen resorbable membrane (Zimmer Osseoguard, Zimmer Biomet, Warsaw, IN, USA). (F and G) The 6-month postoperative follow-up CBCT showing the densely packed bone graft along axial sections. (H) The 6-month postoperative follow-up CBCT showing a well-reconstructed buccal plate, with a radiolucent area at the coronal part of extraction socket, and the healthy right maxillary sinus.

Declaration of competing interest

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

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References

1. Ibrahim HHH, AlAli AM, Schütz P, Rajab B. Transantral approach for surgical removal of impacted maxillary second premolar located in trifurcation of molar roots: a case report. *Oral Surg* 2021;14:172—7.
2. Valentini P, Artzi Z. Sinus augmentation procedure via the lateral window technique reducing invasiveness and preventing complications: a narrative review. *Periodontol 2000* 2023;91: 167—82.
3. McCrary H, Skirko JR. Bone grafting of alveolar clefts. *Oral Maxillofac Surg Clin North Am* 2021;33:231—8.
4. Silberman JJ, Moldauer BI, Torres J, Gallardo C, Sanabria-Liviac D. Palatal root surgery of a maxillary molar using a piezosurgery transantral approach with simultaneous sinus lift grafting: a case report. *Int Endod J* 2021;54:464—75.
5. Park WB, Pandya M, Han JY, Kang P. Large grafting void resembling a surgical ciliated cyst following maxillary sinus augmentation. Four case reports with histological observation. *Medicina (Kaunas)* 2022;58:1300.

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